TEXTILES PAPER LEATHER

AMERICAN DYESTUFF REPORTER

Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME X JANUARY 2, 1922 NUMBER 1

FEATURES OF THIS ISSUE

Charles F. Goldthwaite presents an able plea for the use of "decimal pounds" as a substitute for metric weights.

"Logarithmic Constants for the Textile Chemist," by George R. Pensel, shows how the textile chemist may use logarithms to advantage. Tables are included.

Proceedings of the American Association of Textile Chemists and Colorists include a communication from the President, report of Council meetings, and progress of Local Sections.

Subject and Author Index of the first seventeen issues of the Monthly Technical Supplement.

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AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Devoted to the Practical Application of Dyestuffs and the Mechanical Equipment Incidental Thereto

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Decimal Pounds, or Metric Weights

A Reminder to Chemists and Dyers that There Is a More Convenient Way of Handling Avoirdupois Quantities in Terms Understood in the Office—Scales and Weights Are Obtainable

By CHARLES F. GOLDTHWAITE

Chemist, Klearflax Linen Rug Company, Duluth, Minn.

THE agitation for the adoption of the metric system into industry is always with us, but the possibility of such a change is still very remote. In the meantime, why not take advantage of more of the possibilities of our present "pounds"? No doubt our cumbersome pounds, ounces and grains look as impractical to some Europeans as the English pounds, shillings and pence to us. The difference between the present and a decimal system can be easily illustrated by working a few problems in terms of English money and then performing the same operations in our own monetary units. It is just the same in figuring weights, and there is one possibility of which we can easily take advantage, although it is apparently little used—the employment of decimals of a pound in place of ounces and grains.

Two Systems Compared

It is not only an advantage in the mill, where large numbers of miscellaneous weighings are made—especially in dyehouses—but will save a great deal of time in the offices where are kept inventories, cost and other records. Prove it to yourself. Add the two columns of figures which, we will say, represent weights of a certain dyestuff used during a day. Which can you do more rapidly? In which sum have you the more confidence? Which would you rather pay your help to do?

0.7324 lb.	.....	11	oz. 50 gr.
1.25 lb.	.....	1 lb. 4	oz.
0.313 lb.	.....	½	oz.
3.50 lb.	.....	3 lb. 8	oz.
0.265 lb.	.....	4¼	oz.
0.1915 lb.	.....	3	oz. 75 gr.

Now suppose these amounts are to be taken from your last inventory. You can subtract the first at once accurately. You do the best you can with the other and probably approximate the sum to save some more figuring. The next step is to deduct the value of the dye used from that shown on the inventory sheet, so this sum must be multiplied by the value per pound. The first sum can be multiplied directly. The second, if you want an accurate result, is reduced to a *decimal* and then multiplied. Why, then, not have the decimal in the first place?

That the use of decimal weights in dyehouses is practical is shown by its continued use for five years, at first by the writer and more recently by two dyers who had previously been accustomed to pounds and ounces. It is also used for many special purposes in the laboratory along with the metric system.

Younger Element May Profit

It is not expected that the older dyers who are accustomed to thinking in terms of ounces and grains will care to adopt a new system, but there is no good reason why students and those who have not yet acquired fixed habits should not become familiar with decimals of a pound and use them whenever possible.

Upon analysis it appears to be a question whether a dyer is really used to thinking in ounces when dyeing a set of pieces or batch of raw stock. If he has used ten ounces of some color and it is not enough, does he think of the lot as needing another *ounce* or (perhaps unconsciously) think of it as requiring about 1/10 or 10 per cent of what has already been used? Judging from the facility with which experienced dyers can work with laboratory quantities, or either large or small practical

lots of varying weight, it would seem that they must work largely on a percentage basis, visualizing the amount already used and adding some definite proportion of it if more of any color is needed The writer has certainly worked in this way on grams of stock as well as on very large lots, and the method is probably common although perhaps unrecognized. If, then, our work is based on *figures* rather than on ounces and grains, it does not matter much what the figures represent as far as the dyeing is concerned, and we may as well use the decimals along with our pounds.

How the Dyer Can Avoid Extra Calculations

It might appear from what has been said up to this point that decimals will be of more help to the office than to the dyer himself, but such is not at all the case. Assume that a formula for 125 pounds of stock takes one pound, six ounces, of color. How much will be required for 175 pounds? This represents a common problem and usually there are from two to four colors instead of one. However, you figure it, if you want an accurate result you change to a decimal and then go ahead. The result is in decimals and you change each back to ounces to weigh it out. There is an extra operation for each dye at each end of the calculation which can just as well be entirely avoided by the use of decimal scales.

Suitable balances or scales graduated in decimals do not seem to be very common, but they *are* obtainable from well-known manufacturers. A scoop scale with a capacity of ten pounds and a beam graduated in hundredths of a pound was found to be a stock article and has proved very satisfactory for general use. In this case the smallest division, 1/100 of a pound, is 1/6 of an ounce, and it is usually not necessary to weigh much finer than this on large lots of stock. For closer work a "cement scale" can be obtained from any chemical apparatus supply house, graduated directly to 1/10,000 of a pound, which is less than a grain. Still more convenient scales for particular purposes could no doubt be obtained, graduated to order, and the time saved by their use would quickly pay the extra expense. No doubt, also, a real demand for such scales would induce manufacturers to stock a better line.

"Decimal Pound" Weights

It will not even be necessary in all cases to buy new scales, as the apparatus houses also carry decimal pound weights for use with "even balance" scales. A set running from 0.5 to 0.001 pound, this smallest weight being equal to seven grains, and the whole adding up to one pound, is easily obtainable. The weights above one pound will either be on hand or can be obtained in any convenient way and the whole set can be made to answer practically any purpose.

If a change of scales is attempted, however, it is best to make it very gradually, preferably starting with new formulas. The work is also facilitated by the use of a simple table of equivalents until somewhat familiar with the new units:

Equivalents of Ounces in Decimals of a Pound

Oz.	Decimals	Oz.	Decimals
¼	0.0156	8	0.5
½	0.0312	9	0.5625
1	0.0625	10	0.625
2	0.125	11	0.6875
3	0.1875	12	0.75
4	0.25	13	0.8125
5	0.3125	14	0.875
6	0.375	15	0.9375
7	0.4375	16	1

Connecting Up with the Office

The writer is not in any sense opposed to the metric systems, as it would offer many advantages; for instance, in a print works where formulas are made up from both solids and liquids. It does not fit in well, however, with weights of cloth or other materials employed in the rest of the plant Dyes and chemicals are almost invariably bought by the pound and the office systems are based on pounds, so the use of the metric system does not appear as practical at present as that of pounds and decimals. Therefore, while the idea of decimal pounds is by no means new, it seems worth bringing again to the attention of chemists and dyers who may not have tried it.

It is no more difficult for intelligent overseers and help to work with decimals than it is for machinists to do part of their work by quarters and sixteenths of an inch and the finer work in thousandths. Try it with an open mind and a little care at the start and you will find yourself well repaid.

DU PONT ANNOUNCES PONTACYL VIOLET 6BN AND DU PONT ORANGE RO

The Dyestuffs Department, Sales Division, E. I. du Pont de Nemours & Co., announces placing on the market Pontacyl Violet 6BN and Du Pont Orange RO. The former, states the announcement, is identical with the pre-war Acid Violet 6BN, and was formerly consumed more freely than any other of the Acid Violets, being especially suitable for dress goods in producing Navy Blues, etc., in combination with Wool Green S.

Du Pont Orange RO, and Acid Orange, is like pre-war Orange RO, which always had a large sale. It is of particular interest to paper mills and is, as is understood, stronger and more brilliant, as well as more reddish, than Orange II Concentrated.

Dr. William G. Beckers has been elected a Director of the Allied Chemical & Dye Corporation to succeed H. H. S. Handy, who recently resigned as Vice-President and Director

Dye Soap

A Brief Outline of the New-Grown Industry and Its Possibilities

By ARTHUR T. BRAINERD*

H. A. Metz & Co., Chicago, Ill.

TO those unacquainted with dye soap its introduction can be made in a few words taken from some of the enthusiastic advertisers of this new home dye product. "Dyes as It Cleans," "Will Not Streak, Run, or Fade," "Soils Neither Hands nor Utensils," they tell us.

The industry, if such it might have been called, was practically dormant for many years, though one or two attempts were made in years past to interest the public in dyestuff and soap mixtures which would be acceptable for home dyeing.

The unusual situation which developed in the dyestuff industry during the war, and the consequent publicity given to the manufacture and consumption of dyestuffs, paved the way in the public mind for the introduction of a new "dye" suitable for home application. Naturally simplicity of manipulation was one of the foremost factors to be considered by any one seeking to make capital of the new opportunity. With this point in mind, one company put on the market a combination of dyestuff and soap which could be used effectively without boiling.

Industry Is Large Dyestuff Consumer

From that beginning an industry has developed that is of much interest to merchandisers of dyestuffs because the public accepted the new soap with which it could wash its silk waist pink to-day and yellow to-morrow. Though dye soap as first produced had many disadvantages which caused much skepticism as to its success, it was so vigorously advertised and so widely distributed that the manufacturers became enormous dyestuff consumers within an amazingly short period of time.

During the first year or two of the life of the reborn industry it was generally assumed that only basic dyestuffs were suitable for combination with soap. Though much of the coloring power of basic colors is lost in an alkaline bath, nevertheless excellent tints are produced on silk by such a combination. Such tints formed the formation concerning dye soap manufacture.

Use of Direct and Acid Colors

The fact was soon discovered, however, that most direct and some acid colors could also be used if properly incorporated in the soap base. Many freak combinations of colors are successfully used. The dye soap maker disregards the laws of chemistry and proceeds to use impossible recipes calling for Methylene Blue, Fast Red and Direct Black combined in a cake of soap.

Many discussions have taken place as to whether the ultimate dye soap is merely a mechanical mixture, or whether a chemical reaction actually takes place and a new compound is thus produced. Most chemists, who are also soap manufacturers, are inclined to the latter theory. One argues that Chrysoidine is changed from an orange to a brilliant yellow when applied in the alkaline bath of the dye soap. Another points out that the same proportion of Methylene Blue and soap can be made to produce either a light greenish tint or a deep blue shade by a slight variation in the process of production. A large amount of research work has been done in order to gain complete control of the various color combinations.

Growing Market for Dye Manufacturers

The development of satisfactory dark colors was early recognized as necessary for the commercial success of dye soap as a universal home dye. This development is of interest to the dyestuff manufacturers, as it is in dark colors that quantities of anilines are used. With the comparatively large quantity of dyestuff contained in a cake of dark color soap, it is essential that the particles of dye be completely dissolved and properly distributed. If this were not done the user would be obliged to prepare the dye bath exactly as though straight dyestuffs were used. The dye soap manufacturer had told his customers to "rub it thoroughly," and it was therefore necessary for him to give his customer a cake of soap free from specks of dyestuff. Water could not be used as a solvent, since the volume required would be so large that a hard finished soap could not be obtained. It was therefore necessary to dissolve the dyes in specially prepared oils capable of completely dissolving water soluble colors. After solution in this manner the finished soap can be hardened. This process is the basis of several patents obtained by the inventors.

Further development rapidly followed. Direct colors are now added to practically all soaps, so that cotton fibers are truly dyed, instead of weakly stained. Basic

*The writer is largely indebted to L. C. Cates for information concerning dye soap manufacture.

colors have been replaced largely by neutral and direct colors which dye silk much faster to light and washing. The soap has also been put on the market in flake and powder form. Wool dyeing with dye soap is not as a rule wholly successful, but the fact that some of the products are satisfactory was demonstrated to the writer when he was shown an army overcoat redyed a beautiful black with one of the popular brands of dye soap.

It is of more than passing interest to note that one of our enterprising dye soap manufacturers found himself cornering the market on some dyestuffs during the early period of American manufacture. So thoroughly did he clean up available supplies that the reaction forced him to pay large premiums on job lots whenever they could be located. This manufacturer invested about $200,000 in a dyestuff plant and within a few months supplied his soap factory with nearly all its "crude" dyes.

The dye soap manufacturers feel that their industry is still in its infancy. Although their sales have already been tremendous, concentrated effort has only lately been directed to export trade, which apparently will be far greater than the domestic consumption. The world likes to dye at home and the introduction of dye soap is making the art of home dyeing more convenient and simple.

As a present and future good customer, the dye soap manufacturer expects and deserves the assistance and support of the dyestuff producer in solving his numerous existing problems and those which will inevitably arise

Logarithmic Constants for the Textile Chemist

A Number of Examples of Their Use, with Tables

By GEORGE R. PENSEL, B.T.C.

Chemist, Ritter Textile Company, Amsterdam, N. Y.

THE use of logarithmic constants for rapid calculation is of value to the textile chemist who tests deliveries of chemicals involving the use of acidimetry and alkalimetry.

The solutions most commonly used are N/2 hydrochloric acid and N/2 sodium hydroxide.

J. T. Baker's sodium carbonate C. P. special (anhydrous) is very satisfactory for the standardization titration against N/2 hydrochloric acid.

Sodium bicarbonate C. P. can be ignited to the carbonate, but the sodium carbonate C. P. special ignites to constant weight quicker, since only the mechanical moisture is to be driven off.

Indicators are used which will accurately show the point of saturation.

Let us assume that 0.6001 gram of sodium carbonate requires 23.65 c.c. of the standard hydrochloric acid solution, and with three other weighings and titrations the average log grams sodium carbonate per cubic centimeter hydrochloric acid was found to be 0.40443. The characteristic here and in subsequent figures has been purposely disregarded, since it is easy to determine the proper position of the decimal point through constant use of the table.

To find the log grams per cubic centimeter HCl of any given chemical, it is only necessary to add the log of $\frac{\text{2 equivalents}}{NA_2CO_3}$ to log grams NA_2CO_3 per cubic centimeter HCl.

For the determination of NaOH in caustic soda by titration with standard HCl solution, the following is an illustration of the method of calculation:

$$\frac{2NaOH}{NA_2CO_3} = \log 87845$$

Log 87845 + log 40443 = log 28288 (log grams Na_2CO_3 per cubic centimeter HCl = 40443).

Log 28288 = log grams NaOH per cubic centimeter HCl.

Log 28288 + log cubic centimeter HCl (used in titration) + log 100 — log weight caustic soda = log per cent NaOH in caustic soda.

It can readily be seen that log 87845 is a constant for all determinations, while log 28288 is a constant as long as the HCl holds its value.

Check titrations can be made from time to time, and should the grams Na_2CO_3 per cubic centimeter HCl vary, a simple addition of the new log to the constant, $\frac{\text{2 equivalents}}{Na_2CO_3}$, corrects the value of the solution.

The following are permanent constants representing $\frac{\text{2 equivalents}}{Na_2CO_3}$:

Lactic acid	23003
Lactic anhydride	18406
Oleic acid	72602
KH tartrate	54993
Acetic acid	05346
NaOH	87845
Na_2O	76737
Stearic acid	72924
KOH	02505
$AlCl_3$	94968
Triolein	74513
HCOOH	93826
NH_3	50676
$Na_2Si_4O_9$	45601
NH_4Cl	00366
HNO_3	07534

$NaHCO_3$	20011
ZnO	88474
HCl	83760
$NaHSO_3$	29309
Na_2SO_3	07531
H_2SO_4	96595
Rosin acids	81439

HCL Solution Temporary Constants

The table below shows the HCl constants, which will be called "temporary constants." These, of course, result from adding log $\frac{\text{2 equivalents}}{Na_2CO_3}$ to log grams Na_2CO_3 per cubic centimeter HCl.

Log permanent constant + log 40443 = log temporary constant.

Lactic acid	63446
Lactic anhydride	58849
Oleic acid	13045
KH tartrate	95436
Acetic acid	45789
NaOH	28288
Na_2O	17180
Stearic acid	13367
$AlCl_3$	35411
Triolein	14956
KOH	42948
KCOOH	34269
NH_3	91119
$Na_2Si_4O_9$	86044
NH_4Cl	40809
HNO_3	47977
$NaHCO_3$	60454
ZnO	28917
HCl	24203
$NaHSO_3$	69752
Na_2SO_3	47974
H_2SO_4	37038
Rosin acids	21882

It is simply necessary to establish a ratio between the HCl and NaOH based on the point of saturation, using the proper indicator.

The log grams per cubic centimeter HCl values given above + log cubic centimeter ratio $\frac{HCl}{NaOH}$ gives log grams chemical sought per cubic centimeter NaOH solution.

The following values are based on a log ratio of 02145, the log grams Na_2CO_3 per cubic centimeter remaining 40443:

NaOH Solution Temporary Constants

Log permanent constant + 40443 + log cubic centimeter ratio $\frac{HCl}{NaOH}$ = log temporary constant.

Lactic acid	65591
Lactic anhydride	60994
Oleic acid	15190
KH tartrate	97581
CH_3COOH	47934
NaOH	30433
Stearic acid	15512
$AlCl_3$	37556
HCOOH	36414
NH_3	93264
NH_4Cl	42954
HNO_3	50122
HCl	26348
$NaHCO_3$	62599
$NaHSO_3$	71897
H_2SO_4	39183
KOH	45093
Rosin acids	24027

In the calculation of B.t.u. (Emerson calorimeter) a logarithmic constant is not without value for a rapid calculation.

The following formula is given as an illustration:

B.t.u. Calculation
Emerson Calorimeter

$$\frac{\text{Wt. water (in grams) (°C.)}}{\text{Wt. coal (in grams)}} = \text{calories}$$

$$\frac{\text{Wt. water (in grams) (factor) (°C.} \times 1.8)}{\text{Wt. coal (in grams) (factor)}} = \text{B.t.u.}$$

1.8 changes °C. to °F.
Factor is to change grams to pounds.
The factors cancel, so the ratio is not changed.
Add water equivalent factor to weight of water (1900 + 464 = 2364).

Log. Wt. water	37365
Log °C.	X
Log 1.8	25527
Total	62892 + log X
Coal (in grams)	log Y

62892 + log X — log Y = log B.t.u.
or
62892 + log °C. — log wt. coal (in grams) = log B.t.u.

New Line of Drying Machinery Described

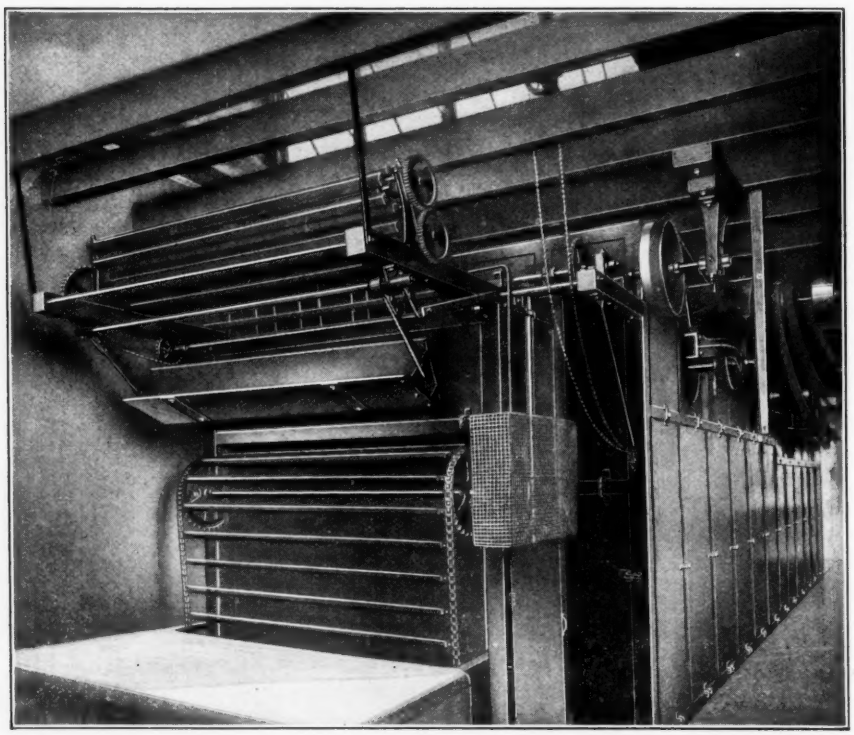
Various Structural Features Designed for Maximum Heat Conservation and Ruggedness

A NEW line of textile drying machinery has just been placed on the market by the Grinnell Company which has been designed with the aim of combining the best drying principles with the strongest and the most workmanlike construction practice.

In maximum heat conservation lies one of the features of these machines, which are built with an insulation of 1-inch air-cell asbestos placed between two walls of sheet metal.

Easy Access to Interior

The supporting structure of the housing is made of 10-gauge pressed steel members bent into suitable channels and angles. On this framework are clamped panels made up of sheet metal and asbestos, as described above. This construction gives immediate access to the interior of any part of the dryer.



Grinnell Looping Dryer

Heating coils are made up of 1-inch pipe tested to 175 pounds. These coils are supported in the dryer well above the floor in order to promote the best circulation of air over and through the pipes, and also to afford easy cleaning of the floor beneath the coils.

Protecting Goods from Oil Drippings

Much trouble has often been experienced in dryers due to the dripping of oil from the fan bearings onto goods within the dryer. To overcome this difficulty, fan bearings are enclosed in a conical metal housing which is open to the outside air but is closed with respect to the interior of the dryer. Only the fan shaft extends through from one side to the other. Attendant on the prevention of oil getting through to the goods is the additional feature of keeping the bearings themselves in the comparative cool of the outside air.

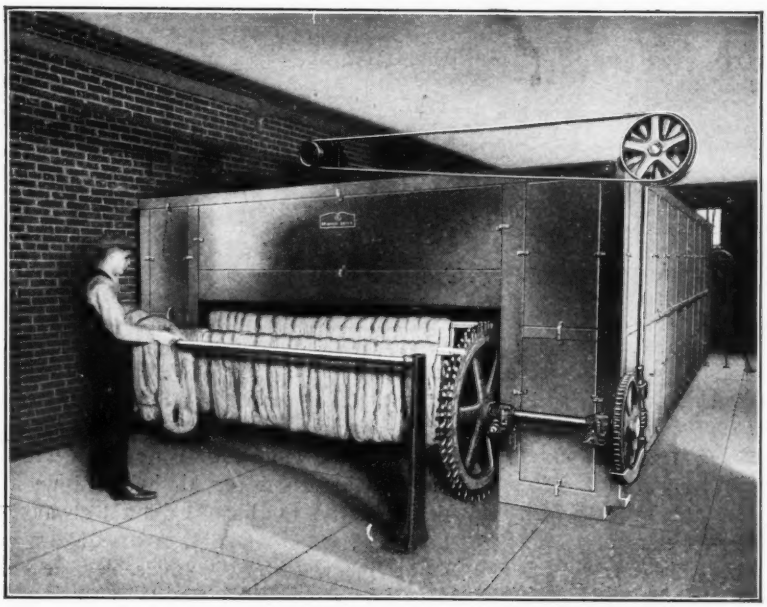
Roller bearings are provided throughout to reduce friction losses to a minimum.

Another item on which especial stress is laid is the efficient utilization of the warm air within the dryer. In the past, much trouble has been experienced in conveyor dryers due to the excessive temperature of the air at the delivery end of the machine and to the high moisture content thereof.

Utilization of Warm Air

In this new line of dryers the trouble is largely eliminated by graduating down the radiating surface in each section progressively from the feed to the delivery end. Stock leaves the dryer in a comparatively cool state, as it should, and the moisture content of the air at that point is low. Air is taken in at the delivery end and, by means of specially designed baffle plates, is given a spiral motion from one end of the machine to the other.

With regard to the apron construction in the conveyor types of machinery, malleable iron chains are used, one on each side of the dryer. At evenly spaced intervals in the chain are links with special projecting attachments in the form of short studs, which fit into the ends of pieces of ¾-inch pipe. These pipes, extending crosswise from one chain to the other, form the carriers for the wire cloth apron which is attached thereto. All the pulling strain from the chains is, therefore, transmitted to the pipes rather than to the wire cloth itself.



Delivery End of Grinnell Automatic Yarn Dryer

Agitators

Agitators are placed at suitable intervals, to stir up the stock and promote even drying. The rotation of these devices picks up the material in a direction with the apron travel.

On all continuous type dryers the apron is driven through specially designed cone drives. With this arrangement any desired speed can be obtained, so that the exact point between underdrying and overdrying can be obtained. With the customary step pulley drive, this is not possible.

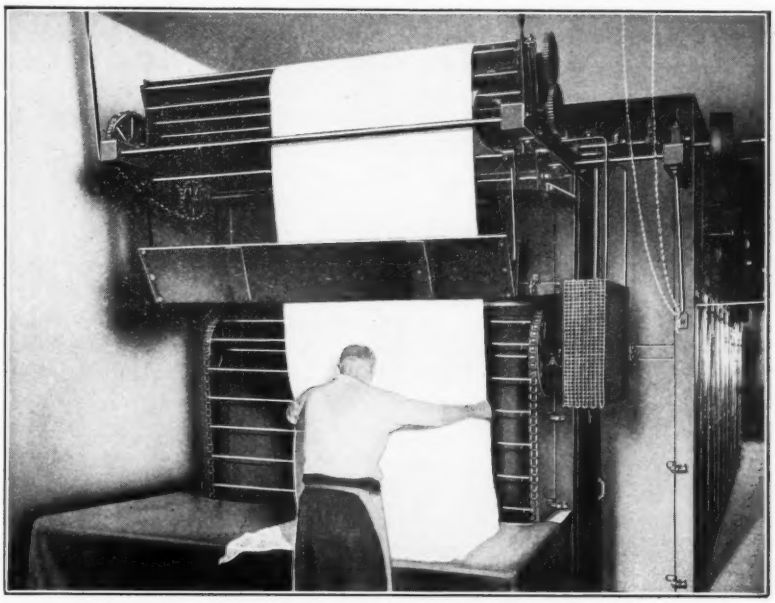
On the looping dryer this cone drive feature serves a dual purpose. In addition to the main cone drive controlling the forward movement of the pole carrying chains which support the loops, there are two additional sets of cones, one at either end of the machine and each controlling the speed of a set of rolls through which the cloth passes. The rotational velocity of either set of rolls may be changed independently of the other, and by this means any shrinkage of the goods as it dries, with the attendant shortening of the loops, can be compensated for.

Uniform Air Distribution

Of course, in continuous types of dryers any and all parts of the goods being dried pass progressively through the slowest and the fastest moving air currents, and uniform drying is naturally obtained. In the stationary types of machines, however, in which the goods remain at rest in a compartment, it is imperative that the distribution of air through that compartment be absolutely uniform, and to this end a specially designed diffusion plate is placed between the fan and the goods.

The average area of the openings in the plate is somewhat less than the area of the fan; furthermore, as in the case of the truck yarn dryer, wherein this plate is formed of a series of parallel slats lying horizontally above the skeins, the openings between slats increase progressively in width from the side nearer the fan to the opposite side. Uniform air distribution is thus produced.

The fundamental principle in Grinnell dryers is to complete the drying process by the slow movement of a very large volume of only moderately heated air, and this principle has been so worked out that the advantages of low temperature drying are secured with no advance in power or heating costs. This combination of low temperature and large volume brings about the effect of drying on a cool fall day with a strong, steady wind blowing. In other words, it approximates the ideal drying conditions obtainable in nature.



Delivery End of Grinnell Automatic Looping Dryer

On the Action of Dilute Sulphuric Acid on Cotton Cellulose, and an Improved Method of Testing for Oxycellulose*

By EDMUND KNECHT and E. P. THOMPSON

THE affinity for Methylene Blue of cotton which has been tendered by dilute sulphuric acid appears to have been first observed by Girard (*Comptes rendus* 81, 1105, 1875), and was later studied more comprehensively in Camille Koechlin (this *Journal*, 1888, p. 163). He showed that the maximum effect of sulphuric acid of 93 deg. Tw. in imparting to cellulose an affinity for Methylene Blue was obtained after six hours' treatment at 15 deg. Cent. More recently W. Harrison (this *Journal*, 1912, pp. 238 and 359) has further contributed to our knowledge of the subject and has shown that the product resembles oxycellulose not only by its increased affinity for Methylene Blue, but also by its decreased affinity for direct cotton colors. He mentions incidentally that cotton tendered either by dilute sulphuric or hydrochloric acid reacts with phenylhydrazine and that the products consequently resemble oxycellulose also in this respect. The fact that cotton tendered by hydrochloric acid does not show any increased affinity (the affinity in fact is decreased) for Methylene Blue is also alluded to in Harrison's first paper. This difference in behavior is explained by the assumption that the colloidal form of hydrocellulose produced by sulphuric acid is different from that produced by hydrochloric acid.

Soon after Chardonnet silk had come into the market an attempt was made by one of the authors to explain the affinity of this fiber for the basic colors. A qualitative examination of this fiber revealed the presence of sulphur and a quantitative determination showed that this was present to the extent of between 1 and 2 per cent (calculated as H_2SO_4). This sulphur could not be extracted by carbon bisulphide. It was considered at the time that the sulphur had come from the ammonium sulphide used in denitrating, and that it might possibly be present as a thio-cellulose, and this might, by analogy with oxycellulose, account for the affinity of the fiber for basic colors. In view of our new results it would now appear that this view was probably erroneous.

The present work was undertaken as part of a more comprehensive investigation on the products of limited oxidation of cellulose, mainly with a view to throw further light on the cause of the similarity which exists in the reactions of oxidized cellulose (oxycellulose) and cellulose tendered by sulphuric acid. As far as possible the conditions of concentration, time, and temperature, as well as the copper numbers, Methylene Blue absorption and tensile strengths of the oxidized and partially hydrolyzed yarns and fabrics, have been recorded. It was found that whereas the affinity of cotton tendered by sulphuric acid was increased for Methylene Blue and decreased for a direct cotton blue, it did not always react with phenylhydrazine or para-nitrophenylhydrazine. This reaction, in fact, was scarcely noticeable unless the action of the acid became so drastic as to cause more or less complete dismemberment of the fiber. In the case of hydrochloric acid, it was scarcely noticeable under any conditions. The observation made by Harrison to the effect that even after treatment with caustic alkali the sulphuric acid-tendered cotton retained its affinity for Methylene Blue was confirmed. Further investigation of the product led, however, to the remarkable observation that after washing with water and then subjecting to prolonged boiling with normal caustic soda it contained sulphur. Quantitative determinations showed that this amounted to about 1 per cent (expressed as H_2SO_4). This result coincides with the presence of about a similar amount of sulphur in Chardonnet silk and with the difficulty experienced in removing all the sulphuric acid in "stabilizing" guncotton. It probably also accounts for the fact that whereas nitrocellulose made with mixed acids gives on denitrating a product which dyes with basic colors, nitrocellulose made by nitric acid alone and subsequently denitrated has no affinity for these dyestuffs (Knecht and Lipschitz, *J. S. C. I.*, 1914, p. 116). Although there is at present no evidence to show in what form this sulphur is contained in the cotton fiber, it seems now fairly evident that its presence is the cause of increased affinity for basic and decreased affinity for direct colors. These properties persist even after boiling with caustic soda, as does also the property of the treated fiber of yielding a more or less intense orange coloration when warmed in an acetic acid solution of *p*-nitrophenylhydrazine.

Bleached cotton yarn (with a copper number of 0.6) was wetted with about its own weight of sulphuric acid of 1.065 sp. g., and dried at 50 deg. Cent. for two hours. This treatment had completely destroyed the fibrous structure. The copper number was found to be 5.2.*

*A communication to the Society of Dyers and Colourists, published in the journal of the Society, Nov., 1921.

*All the copper values given relate to air-dried material.

(*Continued on page* 23.)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

President
LOUIS A. OLNEY
Lowell Textile School, Lowell, Mass.

Vice-Presidents
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Secretary
WALTER E. HADLEY
5 Mountain Avenue, Maplewood, N. J.

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516 Atlantic Avenue, Boston, Mass

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ELMER C. BERTOLET WILLIAM K. ROBBINS
ARTHUR E. HIRST WALTER M. SCOTT

COMMUNICATION FROM THE PRESIDENT

The American Association of Textile Chemists and Colorists is well under way as far as organization is concerned. Several Council meetings have been held; the Research Committee has been organized and is making definite plans for future work; and the other committees provided for in the Constitution have been appointed.

The application for a Providence Section was soon followed by another for a Boston Section, and both of these have been approved by the Council. It is understood that active measures are being taken toward the formation of a New York Section and inquiries have already been made in regard to the possibilities of a North Adams Section.

Group activities of the various types described are fundamental, and are absolutely essential for the life and development of any organization. Without them no momentum could be attained and but little of a constructive nature accomplished. We must, however, continuously keep in mind the fact that it is the individual interests of the members—both as to what they may receive and what they may be able to contribute in the way of interest and service—that will determine the ultimate success of any organization of this kind. In other words, it is the sum total of individual endeavors that determines the real accomplishments of the Committees and Council, the various Sections and finally the organization as a whole

If this is the case, would it not be well to consider a few of these individual interests and the various ways in which members may receive the greatest good from, and in return contribute most effectively toward the development of, the Association.

In the first place, the Council will at all times be glad to receive suggestions and expressions of opinion from any of the members as to what type of activities will be of greatest value. As a specific example of the kind of assistance that might be given by members the following may be mentioned as an example: The AMERICAN DYESTUFF REPORTER by special request has assigned to us the central portion of their publication which, hereafter, is to be biweekly. The reason for requesting this particular location was in order that the proceedings might be removed from the rest of the journal, so that they might be bound as a continuous record of the work of the Association. To still further facilitate this, the publishers have been asked to number the pages of the proceedings consecutively at the bottom. In order that this may be satisfactorily accomplished it will involve the somewhat difficult undertaking of presenting exactly four pages or a multiple of four pages to the publisher for each edition in which our proceedings may appear. This means that we must always have sufficient material on hand for publication to facilitate this rather exacting requirement.

We should therefore be pleased to have *all* the members write a letter stating just the type of material they would like to see published in this section. Fundamentally, it will contain the official reports of Council and Committee meetings; the reports of Sectional meetings as soon as any may be held, with the publication as far as possible of all papers read before these Sections; any communications received from the members which may be deemed desirable to publish; all notices in regard to future meetings, election of new members, changes of addresses, etc. We wish to publish in this section any and all material available that may be of interest or value to the members and are taking this method to find out just what is wanted. *Please answer this question just as fully and promptly as though a special questionnaire had been sent to you.*

A valuable contribution to this section will, we hope, be the various communications which may be forwarded by members in regard to work they are doing, experiments performed in their laboratories, new methods devised, confirmation of the value of old methods, various interesting discoveries that they make from time to time and also such comments as they may wish to make in regard to the papers or reports which may be published. as well as replies to the communications of any other members.

It is not essential that papers be presented before a Section in order to be available for publication. We shall be pleased to receive and publish at any time such papers as the publications committee may deem to be of sufficient interest and value to the members.

Most members would say, at first thought, that there was nothing about which they could write, but further inquiry would reveal the fact that nearly every member has some special interest about which he could write something, even though it might be but little.

Think these things over conscientiously and let us hear from you 100 per cent strong.

(Signed) LOUIS A. OLNEY, President.

SECOND COUNCIL MEETING

The second meeting of the Council of the American Association of Textile Chemists and Colorists was held Friday, December 9, at the Engineers Club, Boston, Mass.

The following members were present:

Prof. L. A. Olney, Wm. D. Livermore, Wm. K. Robbins, Geo. A. Moran, A. E. Hirst, Wm. H. Cady, W. M. Scott, Winthrop C. Durfee, W. E. Hadley.

Letters were read from James L. Amsden and Prof. E. C. Bertolet, who were unable to be present.

A letter from the Textile Alliance, Inc., was read which stated that it was the opinion of the present members of the Dye Advisory Committee of the Department of State that the addition of a member nominated by the American Association of Textile Chemists and Colorists would be of material assistance and that a number of dye consumers and manufacturers would be benefited through being in closer touch with their work in the matter of obtaining an adequate supply of German dyestuffs, satisfactory substitutes for which are not being produced in this country.

Furthermore, this letter stated that in accordance with their belief a resolution had already been passed which provided that with the approval of the Department of State the American Association of Textile Chemists and Colorists be requested to designate a representative who might be appointed by the Department of State to the Dye Advisory Committee and added to the Dye Advisory Committee of the Textile Alliance, Inc.

A discussion of this matter led to belief that such action would be desirable and that the Association might render more direct service to its members and their interests by such an affiliation.

In this connection, it was unanimously voted to recommend the appointment of William D. Livermore to serve as a representative of the American Association of Textile Chemists and Colorists. Mr. Livermore subsequently accepted the nomination and his name was forwarded to the Textile Alliance, Inc.

A number of applications for membership have already been received but in accordance with the Constitution, Article IV, no action could be taken until the expiration of thirty days after a list of such applicants had been forwarded to each member for their consideration.

Winthrop C. Durfee presented a petition signed by forty-two members of the Association requesting permission for the formation of a Local Section in Boston. It was voted to authorize such a Section, and Winthrop C. Durfee was appointed secretary *pro tem.*

The geographical boundaries were designated to include New England with the exception of Rhode Island.

The desirability of having an official emblem for the Association having been presented to the Council, the matter was discussed and it was decided to defer any definite action until the next annual meeting.

The duties of the Library and Publication Committee were defined as follows:

It was voted that the Library and Publication Committee, acting in co-operation with the president, should be in general charge of the section of proceedings, published in the AMERICAN DYESTUFF REPORTER; that they should examine all papers presented for publication and make an effort to publish in this section such material as will be of greatest interest and value to the members.

It was voted that the duties of the Committee on Membership and Local Sections should be along the lines of securing desirable members and co-operating with Local Sections in developing their activities.

Mr. Livermore stated that but little had been learned in this country in regard to new dyes and coloring processes that might have been introduced in Germany during the past six years. He considered that it would be desirable to ascertain, if possible, what new dyes had been perfected during this period and to this end offered the following resolution.

That the Textile Alliance, Inc., be asked to ascertain if possible through E. S. Chapin, their Paris representative, what new dyes or other allied products used in the coloring of textile material had been perfected and used abroad during the period of the war, but which for some reason or another had not been exported to the United States.

The meeting of the Council was then adjourned.

W. E. HADLEY, Secretary.

RESEARCH COMMITTEE MEETING

The first meeting of the Research Committee was held Friday, December 9, at 4.30 P. M., at the Engineers Club, the following members being present: Council, with exception of J. L. Amsden and Prof. E. C. Bertolet, and in addition Dr. Robert E. Rose and Dr. Wallace J. Murray.

A letter had been received from E. F. L. Lotte, expressing his regrets at being unable to attend.

Upon motion of Mr. Durfee, seconded by Mr. Cady, it was voted that the organization of the Research Committee be the same as that of the Council, the president of the Council being the chairman, and the secretary of the

Association performing similar duties for the Research Committee.

Some time was spent in a discussion as to just what was included under the heading of Standardization The chairman was of the opinion that standardization, as a general term, should include the formulation and approval of methods of analysis, methods of testing and, perhaps later, specifications of some kind referring to compounds used in the textile industry; the establishment of standards expressing the fastness of dyed textile material to the action of acids, soaps, alkalies, etc. Also standard methods for the analysis of dyes and for analyzing chemicals, which can be adopted as more or less official. Also standardization of the nomenclature of dyes. In this connection it was mentioned that the Society of Dyers and Colourists were endeavoring to classify the dyestuffs and were about to issue a publication to be known as the *Colour Index*.

It was suggested that the dye manufacturers might be requested to mention the corresponding number of Schultz and Julius, or of the new *Colour Index* in connection with their products. It was also the opinion that it would simplify matters for the dye users if characteristic names could be used, indicating the dye manufacturer, followed by the commonly recognized name of the dyestuff, together with the index number as indicated above. If the dyes could be better described by a new nomenclature, then that should be used.

It was believed that a start should be made immediately in preparing a set of standards relating to fastness of dyed textile material, and that a beginning could well be made as regards fastness to washing. It was suggested that a series of trials be made with the view of establishing the maximum and minimum fastness.

The matter was discussed with some detail from the standpoint of the silk manufacturer, but it was clearly pointed out that subcommittees could handle wool, cotton and the different textile fibers with such variations as might be necessary.

The first step should be to actually define the basis of fastness and the opinion was expressed that certain definite dyes would have to be chosen which could be considered as possessing certain values when undergoing definite treatments and these known colors could be used to check against the color being examined. The colors within certain ranges could then be designated by different numbers.

It was mentioned that the trials should be conducted in comparison with type samples, it being pointed out in this connection that certain samples of cloth were at one time rejected by the Government simply because the tests conducted thereon appeared to differ from the original sample. When, however, the original and complained of samples were tested under parallel conditions they were found to possess identical properties.

It was pointed out that a rubbing test performed by a heavy scrub woman would of necessity be different than that produced by a ten-year-old boy, but both would arrive at concordant results in comparison with a standard run at the same time.

It was believed that a satisfactory way could be evolved by adopting a number of washing tests, and then using a type color which will stand each test.

Attention was called to the fact that already an elaborate system had been worked out by a number of foreign dyestuff concerns and that a great number of papers relating to this subject have been published, also that an article had appeared on this subject in the *Farben Zeitung* in 1916, giving the report of a German commission which had been appointed for the purpose of such standard methods. A committee representing the garment manufacturers and silk manufacturers is already co-operating with the object of obtaining more satisfactory fastness.

One member was requested to prepare a paper covering bibliography of fastness tests and methods, which could be presented at the next meeting of the Research Committee, and it was suggested that each member, before the next meeting, give special thought to meethods of testing fastness to washing.

It was suggested that, later on, something might be done towards preparing standard specifications for the purchase of dyes and chemicals and a member was asked to prepare a brief outline of this phase of the situation to be presented at the next meeting of the Research Committee.

The meeting was then adjourned until Jan. 13, 1922.

FORMATION OF BOSTON SECTION

At the Council meeting of the American Association of Textile Chemists and Colorists held in Boston, December 9, a petition was presented, requesting the formation of a Boston Local Section.

The petition, which read as follows, was duly signed by forty-three active members of the Association:

"We, the undersigned charter members of the American Association of Textile Chemists and Colorists, desire to organize a Local Section in Boston, and hereby request the official approval of the Council as required by the Constitution of the Association.

"(Signed) Leander F. Conley, Frank W. Biery, Thos. J. Biery, Walter W. Carr, John Everett, John M. Hood, Frank E. Kenyon, Leonard S. Little, Wilfred Lord, A. McMillan, George A. Moran, Samuel Muirhead, Chas. L. Parker, William Welpley, William Woosnam, Louis A. Olney, Arthur K. Johnson, Charles L. Howarth, Fred V. Hanson, R. B. Clogston, Fred Riley, Samuel J. Nichol, Winthrop C Durfee, Walter C. Durfee, Joseph E. Travers, Amos K. Hobby, H. R. Davies, W. B. Butterworth, B. C. Bond, Robert E. Fuller, H. E. Gile, F. A. Keyzer, J. L. Barrington, W. R. Moorhouse, A. K. Gyzander,

Andrew Fisher, P. S. Crowell, John F. Bannan, Simon P. Kenny, William Stoehrer, Samuel A. Stubbs, Warren H. Whitehill, R. C. Smith."

It was the pleasure of the Council to approve the foregoing application, and in accordance with Article XIII of the Constitution, the Council proceeded with the election of a secretary *pro tem,* Winthrop C. Durfee being chosen in this capacity.

While this new Section is to be known as the Boston Local Section, the geographical boundaries of same will embrace the entire area of New England with the exception of Rhode Island, the latter ground already being fully covered by the Rhode Island Section, with headquarters in Providence.

Attention was called to the fact that in accordance with Article XV, members living in Connecticut or other adjacent localities could affiliate with the Rhode Island Section or a New York Section when formed, in case this proved more desirable.

It is a source of great satisfaction to the Council that since the organization of the parent Association, the members have evidenced such a spirit of co-operation. With the development of Local Sections, the diversity of subjects which will be discussed will impart an added interest which should abundantly increase as the different phases of the work undertaken by the various Local Sections develop.

NOTICE FROM THE SECRETARY—APPLICATIONS FOR MEMBERSHIP IN THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

All individuals who believe that they are eligible for membership in the Association and are desirous of affiliating with the organization can communicate with the secretary, who will gladly furnish application blanks and extend to them every possible assistance.

It is desirable that members of the Association should make an effort to interest all those whom they believe would make desirable members.

The secretary will at all times be pleased to provide members with as many application blanks as may be desired.

W. E. Hadley, Secretary,
5 Mountain Avenue, Maplewood, N. J.

INAUGURAL MEETING OF RHODE ISLAND SECTION

Notice of a meeting to organize the Rhode Island Section of the Association was sent out December 23 by William H. Cady, secretary *pro tem,* calling the meeting for Friday, December 30, at the To Kalon Club, 26 Main Street, Pawtucket. The gathering was to be preceded by an informal dinner at the club, and Roscoe L. Chase, formerly manager of the Arnold Print Works, was scheduled to give a talk on "Mercerization," after the business session. Owing to the date of the meeting being contemporaneous with the printing of this issue, a full account cannot appear herein, but will be given in the issue of January 16.

It is particularly requested by the Local Secretary that all members of the Association located outside of Rhode Island who desire to affiliate with the Rhode Island Section will notify Secretary Walter E. Hadley. Several Massachusetts men are already enrolled.

NEW YORK SECTION UNDER WAY

E. H. Killheffer, chairman of the Library and Publication Committee, reports that he has secured more than the necessary number (twenty-five) of signatures to a petition for the formation of a Local Section in New York and that this petition has been turned over to the secretary of the Association for presentation at the next meeting of the Council.

NOTICE OF MEETINGS

The next meeting of the Council will be held Friday, January 13, 1922, at the Engineers Club, Boston, Mass., at 4 P. M.

A meeting of the Research Committee will be held at the same place at 4.30 P. M. of the same day.

Members wishing to bring any matters to the attention of these meetings will please communicate with either the president or the secretary.

CHANGE OF ADDRESSES

The following changes have been made in addresses of members:

Bond, B. C.,
In care of I. Levinstein & Co.,
281 Franklin Street,
Boston, Mass.

Chase, R. L.
151 Elmgrove Avenue,
Providence, R. I.

Fischer, Ralph M.,
Hasco Silk Dyeing Company,
Paterson, N. J.

Friedman, Louis,
Friedman Dyeing Company,
2229 Creston Avenue,
New York, N. Y.

Grady, J. H.
741 East Avenue,
Pawtucket, R. I.

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CHANGE OF ADDRESSES

(*Continued from page* 12.)

LORD, WILFRED,
Pacific Mills,
Lawrence, Mass.

MULLIN, CHARLES E.
E. & L. Company,
Corner Third and Jackson Streets,
Camden, N. J.

NEWSOME, JOSEPH M.,
Cleveland Worsted Mills Company,
Cleveland Heights, Ohio.

OESTERLE, DR. FRANK J.,
Van Raalte Company,
Paterson, N. J.

PECK, CARROLL W.
In care of George Mann & Co., Inc.,
626 Industrial Trust Company Building,
Providence, R. I.

PERLMAN, S. DONALD,
Dyetex Engineering Company,
15 West Thirty-eighth Street,
New York, N. Y.

SAMPSON, ALBERT E.,
National Aniline & Chemical Company,
Boston, Mass.

SMITH, J. VERITY,
Calco Chemical Company,
Bound Brook, N. J.

SOKOLINSKI, JOHN J.,
56 Nostrand Avenue,
Brooklyn, N. Y.

WEEBER, ARTHUR H.,
P. O. Box 105,
Beverly, Mass.

WELPLEY, JAMES L.,
Pacific Mills,
Lawrence, Mass.

WERTHEIM, MORTON H.,
Kraemer Hosiery Company,
Nazareth, Pa.

WINGATE, W. HENRY,
Franklin Process Company,
Providence, R. I.

WARD, L. DACOSTA,
In care of J. L. Stifel & Son,
Wheeling, W. Va.

ADDITIONAL CHARTER MEMBERS

The following names were omitted from the list of Charter Members published in the December number:

FLYNN, THOMAS P.,
American Aniline Products, Inc.,
777 Bedford Street,
Boston, Mass.

MILLSPAUGH, EDWIN S.,
Ciba Company,
Philadelphia, Pa.

MORROW, H. S.,
Queen Dyeing Company,
Atweels Avenue,
Providence, R. I.

MACKENZIE, MORELL,
Glenlyon Print Works,
Phillipsdale, R. I.

PAKISH, CHARLES H.,
33 Hilltop Avenue,
Providence, R. I.

SCHROEDER, C. M. E.
235 Wood Street,
Rutherford, N. J.

STUBBS, SAMUEL A.,
176 North Main Street,
Andover, Mass.

TURNER, TOM,
93 Linwood Avenue,
Pawtucket, R. I.

Differential Reduction of Vat Dyes*

By WALLACE J. MURRAY

Contribution from the Laboratories of Arthur D. Little, Inc., Cambridge, Mass.

INTRODUCTION

The purpose of this paper is to show how the selective reduction of vat dyestuffs may be used for their identification and analysis. The fact is well known that certain vat dyes, such as Thio-Indigo Red B, can be reduced by weak reducing agents, such as sodium sulphide; while others, such as indigo, require powerful reducing agents, such as sodium hydrosulphite. In connection with some analytical work it was found that a brom-indigo also could be reduced by sodium sulphide and dyed from a sulphide vat. This suggested that the ability to dye from a sulphide vat might prove to be a valuable test for distinguishing different vat colors, particularly indigo from its halogenated derivatives. The use of reducing agents other than sodium hydrosulphite and sulphide also promised to be useful.

Since these tests depend upon oxidation and reduction, it may be well to consider briefly at this point the nature

*Read by title at Inaugural Meeting, November 6; now published in full.

of oxidation and reduction reactions. The physical chemist defines oxidation as losing of negative charges by an atom or group of atoms. Reduction is the exact opposite. For example, when sodium sulphide acts as a reducing agent it is itself oxidized; that is, some of the sulphide ions having two negative charges lose them and become free sulphur having no charge. When free sulphur has negative charges forced on it, it is reduced and forms ions again. If an electrode were placed in the solution the negative charges, which the sulphur loses, would go to it and give it a negative charge. The charge on the electrode increases until its tendency to lose negative charges just balances that of the ions. This equilibrium charge would be attained instantly. However, if a charge greater than this were applied to the electrode by external means free sulphur would be reduced by having charges forced onto it. The magnitude of this negative charge can easily be measured with a potentiometer by the ordinary means used for electrochemical measurements. The magnitude of this charge is a direct measure of the tendency of the substance to lose negative charges, which in turn is a measure of its strength as a reducing agent. This measures also the resistance of the oxidation product (in this case free sulphur) to take on negative charges.

When no electrode is present any charges given up by one substance must be taken on by some other as they cannot be destroyed. Therefore, when two substances are mixed and the tendency of one of them to give up negative charges is greater than the resistance of the other to take them on, then the latter substance will be reduced; while if the tendency is less or equal to it, then no reduction will take place.

These remarks apply equally to inorganic reducing agents and to organic ones like indigo white or other reduced vat colors. When a vat color is treated with a reducing agent stronger than its own leuko compound, it will be reduced, but if it is treated with one of the same strength or weaker, no reduction will take place. The reducing power of the leuko compounds of vat dyes may be determined by direct electrical measurements, or by comparison with a graded series of standard inorganic reducing agents. The latter is the method we have employed in our work.

Since the total number of vat dyes is great, it was decided to confine our work to the blue dyestuffs. However, the methods described can be extended to cover other colors as well.

The greater part of our work was confined to indigoid dyes, due to the ease with which their reduction may be followed by the disappearance of color. Carbozole vat dyes act the same way; but with the anthracene vat dyes there is no similar destruction of color.

Experimental Data

I. *Selection of a Graded Series of Reducing Agents.*

The series used, arranged according to decreasing potential or decreasing strength is as follows:

1. Sodium hydrosulphite
2. Sodium stannite
3. Sodium sulphide
4. Sodium arsenite
5. Sodium formate

The last two reducing agents were too weak to affect any of the true vat dyestuffs, and so need not be considered further at this point. They seemed, however, to reduce some sulphur colors, and will be dealt with later when considering such colors.

The strength of a reducing agent depends partly on its concentration. Therefore, reagents of standard concentration must be used in order to obtain consistent results. Our reagents were made up as follows:

1. *Sodium Hydrosulphite.*—Since solutions of this substance do not keep well, it was always used in the dried form. Lykopon, made by Rohm & Haas Company, of Philadelphia, was the grade used. About one-fourth gram was used in each test.

2. *Sodium Stannite.*—First a solution of stannous chloride was made up by dissolving 115 grams of crystallized stannous chloride in 170 cc. of conc. hydrochloric acid. This solution was diluted to one liter and kept in a bottle containing granulated tin. Sodium stannite solutions were prepared fresh for each test, since they do not keep well. They were prepared by adding 28 deg. Be. caustic soda solution to 5 cc. of the stannous chloride solution described above, until the precipitate first formed just redissolved. This took about 5 cc. This gives the correct amount for one test.

3. *Sodium Sulfhide.*—250 grams of the crystallized salt were dissolved in water and diluted to one liter. Ten cubic centimeters of this solution were used for each test.

4. *Sodium Hydroxide.*—A 28 deg. Be. solution of caustic soda was used.

II. *The Determination of the Relative Reduction Potentials of Vat Colors by Means of a Graded Series of Reducing Agents.*

A very fine uniform suspension of one-fourth gram of dyestuff in 100 cc. of water was used for most tests. However, it was proved that the method could be used satisfactorily on much more dilute suspensions when necessary. Five cubic centimeters of such suspensions were treated with the quantity of reagent described above and enough water to make the total volume 20 cc. Reductions were carried out both at the boiling point and at room temperature. These experiments showed that the dyes which we experimented with could be arranged according to decreasing reduction potentials as follows. Dyes bracketed together have about the same potential:

Indigo	Reduce readily with hydrosulphite.
Ahthrene Blue GCD	Reduce difficultly with stannite.
Anthrene Dark Blue BO	Do not reduce with sulphide.

Midland Blue R Hydrone Blue	Reduce readily with stannite.
Midland Blue 5B Midland Vat Blue MB Indigo Pure ADC Ciba Blue 2B Thio Indigo Red B	Reduce difficultly with sulphide.
[Sulphur Dyes]	[Reduce readily with sulphide.]

This table shows: (1) That the relative reduction potential of a dyestuff is a characteristic which could be used for their identification; (2) that the halogenated indigos, like Ciba Blue, have considerably lower reduction potentials than indigo itself, and that this difference can be utilized for distinguishing them.

III. *Influence of Condition of Sample.*

All the results given above were obtained by testing fine, uniform suspensions of the dyestuffs in water. Whenever the sample was a fresh, smooth paste, simple dilution with water gave a satisfactory suspension. However, dried pastes, powders and dyed fibers always gave unsatisfactory results when treated in this way.

IV. *Method for the Preparation of Satisfactory Suspensions from Dry Dyestuffs and Dyed Fibers*

1. *Dry Dyestuffs*—In order to use these tests with powders, they must be first converted into pastes. Such pastes cannot be satisfactorily prepared by simply mixing the powders with water, even when they are ground together. However, the following method has been found satisfactory: 0.25 gram of the powder was mixed with 5 cc. 28 deg. Be. caustic soda solution and 50 cc water; 0.5 gram of sodium hydrosulphite was added and the mixture warmed until reduction and solution took place. The solution was then oxidized with air to reprecipitate the dyestuff, and diluted to 100 cc. The suspension obtained was perfectly satisfactory for the tests.

In order to show the importance of this operation Ciba Blue 2B powder was tested, when ground in water and when treated as described above. The results were as follows:

Ciba Blue 2B Powder

		Ground with Water	Reduced and Reoxidized
Sodium Hydrosulphite	*Hot*	Rapid, Orange Solution	Very Rapid, Yellow Solution
	Cold	Slow	Rapid
Sodium Stannite	*Hot*	Slow, Very Incomplete	Rapid
	Cold	Very Slow, Finally Reduced	Moderate
Sodium Sulphide	*Hot*	Very Slight Reduction	Reduces Fairly Readily
	Cold	No Reduction	Reduces Little, if Any

In order to prove that this method did not affect the reduction of dyes in a paste form, the following experiments were tried:

(a) A sample of Midland Vat Blue MB 30 per cent paste was tested directly, and a second sample was tried, reduced and reoxidized as described above. Identical results were obtained in the reduction test of both of these samples.

(b) A sample of synthetic indigo paste was tested directly, and a second sample of the paste was reduced without drying and then reoxidized. Here, also, identical results were obtained in the reduction tests in both cases.

This proves: (1) That reduction and reoxidization simply change the physical condition of dyestuff, but do not affect its chemical reactions; (2) that the oxidation products of hydrosulphite do not affect the reduction tests.

2. *Dyed Fibers.*—Reduction tests carried out directly on dyed fiber were found to be unreliable. The presence of the fiber apparently affects the ease of reduction of the dyestuff. In order to overcome this difficulty, the fibers were treated with a small quantity of dilute sodium hydroxide, and reduced with the smallest possible quantity of hydrosulphite. After reduction the fiber was removed from the solution and squeezed out against the side of the test tube. The resulting solution was then reoxidized to precipitate the dyestuff. The resulting suspension was found to be perfectly satisfactory for the tests. The amount of dye obtained in this way is usually very small, but is sufficient for the tests if they are carried out with care. The method could not be used with anthracene vat colors since their leuko compounds are substantive to cotton.

V. *Dyeing Tests.*

Whenever we reduce a vat dyestuff in alkaline solution we should obtain a vat capable of dyeing cotton. Therefore, some vat dyestuffs should require a very powerful reducing agent like hydrosulphite to give a vat capable of dyeing; others should dye with sodium stannite, and still others with sodium sulphide. The fact that certain vat colors such as Thio Indigo Red B will dye in a sodium sulphide vat is well known, but apparently no use has been made of this reaction for analytical purposes. In case of indigo, Indigo Pure ADC and Thio Indigo Red B dyeing tests were made of a four-gram sample of white yarn in vats made up as follows:

Hydrosulphite Vat

0.25 gram dry dyestuff
0.3 gram sodium hydrosulphite
2 cc. 3.5 per cent solution caustic soda
70 cc. water

Stannite Vat

0.25 gram dry dyestuff
1 gram stannous chloride crystals
6 cc. 28 deg. Be caustic soda
70 cc. water

SULPHIDE VAT

0.25 gram dry dyestuff
0.7 gram sodium sulphide crystals
0.7 gram sodium chloride
1.5 grams soda ash
70 cc. water

In all cases the dyeing was done the same and the yarn was allowed to steep about one-half hour. The results were as follows:

HYDROSULPHITE VAT

Indigo—Good color
Indigo Pure ADC—Good color
Thio Indigo Red—Not tried

STANNITE VAT

Indigo—Very pale color
Indigo Pure ADC—Good color
Thio Indigo Red—Not tried

SULPHIDE VAT

Indigo—Practically no color at all
Indigo Pure ADC—Fair color
Thio Indigo Red—Fair color

In the case of the other colors small pieces of white absorbent cotton were dyed in the test solutions obtained in the tests described above. In all cases the dyed material was well soaped and rinsed after dyeing. The result of these tests will be given in Table I. These test tube dyeing tests were found to be perfectly satisfactory and therefore should be used instead of the more elaborate tests described first. These dyeing tests were carried out only with a portion of the dyestuffs tests. In many cases the presence of salts in the sulphide and stannite solutions caused a considerable precipitation of the reduced dyestuff, and therefore gave rather weak dyeings, even when the reduction was satisfactory.

VI. *Application of the Tests to Sulphur Colors.*

Sulphur dyes are not considered true vat colors, but since they are frequently used under similar conditions to vat colors it was decided to try the reduction tests on them also. Five different sulphur blues, chosen purely at random, were experimented with, and in each case they reduced to a dark colored vat with sodium sulphide, and to a yellow or orange vat with sodium hydrosulphite. On oxidation the yellow or orange compounds oxidized, first to a substance apparently identical with the one found in the sulphide vat, and then finally into the true color of the dyestuff. This was particularly noticeable when some of the yellow solution was poured onto filter paper and allowed to oxidize there. A list of these experiments with their results will be given in Table II.

These experiments show that the sulphur colors experimented with have two leuko compounds: a colorless one, having a high potential, and a colored one having a much lower potential. If experiment should prove that this is a common property of the sulphur colors, it would be a valuable and simple test for their identification.

Attempts were made to see whether the sulphur colors could be reduced with weaker reducing agents than sodium sulphide, such as sodium arsenite and sodium formate. When these reagents were used a considerable portion of the color dissolved as leuko compound. However, dilute caustic soda acted in the same way, and it was therefore impossible to tell whether the arsenite or formate had actually carried on any reduction. The reduction was very likely due to the presence of free sodium sulphide present in the dyestuff. Attempts were made to destroy this free sodium sulphide by washing or by aerating, but neither one was successful. Therefore, reduction tests with reducing agents weaker than sodium sulphide are unreliable with sulphur colors, although such reduction may, and probably does, take place. Sodium sulphite has been used commercially for the reduction of sulphur colors and is considerably weaker as a reducing agent than sodium sulphide and somewhat weaker than sodium arsenite.

CONCLUSIONS

1. The relative reduction potentials of vat colors may be determined readily by reduction with a series of alkaline reducing agents of graded potentials.

2. The reduction potential of a vat color is a characteristic which is of value in the identification of the color.

3. Halogenation decreases the reduction potential of indigoid dyestuffs.

4. In order to have these tests reliable the dyestuff must be in the form of a very fine suspension in water, such as is obtained by diluting paste color.

5. In case the dyestuff is either a dry powder or is present upon a fiber, it may be obtained in a proper condition for test by reducing and reoxidizing. In the case of the fiber test this would probably be true only of indigo dyes, since the leuko compounds of anthracene dyes are substantive to cotton.

6. The ability to dye cotton is a good indication of the reduction of the dyestuff; although not an absolutely reliable one, due to the partial precipitation of the leuko compound by salts present in the solution.

7. Certain and probably many sulphur colors give two differently colored vats, depending upon the reduction potential of the reducing agents used, but both of these reoxidize to the same color.

Editor's Note—The tables mentioned in the above article will be published in the next issue.

AMERICAN DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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THIS ISSUE

IN accordance with the announcement printed in The REPORTER last week, the present number inaugurates the changed policy which will hereafter govern publication of this magazine. In order that there may be no misunderstanding, we take this opportunity of repeating the gist of what has already been set forth: Publication of the Weekly News Section has been suspended. Publication of the Monthly Technical Section—as a monthly—has been suspended. Both have been combined and will appear henceforward every other Monday, making twenty-six issues per year in all. The bi-weekly magazine, of which the present issue is the first example, will preserve substantially the form in which you now see it, will consists of forty-eight or more pages per issue, and will be made up of the following classifications of contents:

1. Technical articles of high standard, designed to keep the reader abreast of the most advanced chemical thought and practice, prepared by leading textile and color chemists and chemical engineers throughout the industry.

2. The complete Proceedings of the American Association of Textile Chemists and Colorists and its present and future local Sections, together with notices of meetings, announcements, addresses and all news relating to the activities of this important organization.

3. General news of all dye making and dye consuming industries, and of the equipment field, as well as editorial comment, correspondence, patents, reviews, the inquiry department, etc., etc.

No pains will be spared to secure accurate, fresh and authoritative articles and information, and in order to bring this about The REPORTER has no hesitation in asking for the co-operation and criticism of its readers. Suggestions and ideas for making more effective the service which we shall try to render will at all times be welcomed and carefully considered, the sole aim of the publishers being to produce a magazine which will be informative and helpful.

THE INDEX

THE REPORTER provides with this issue an index to the first seventeen numbers of the Monthly Technical Section, from August, 1920, to December, 1921, inclusive. This embraces all of Volumes VIII and IX, and five numbers of Volume VII. Owing to the amount of ground to be covered, this index is not so complete as we could wish; for instance, the titles of patents have been omitted and the various subjects treated under the head of Inquiries have of necessity been handled with rather scant ceremony. Nevertheless, the lists of technical articles and authors are wholly adequate, and in future, when we shall not be obliged to condense the accumulation of seventeen months' material, indices will be in keeping with the best practice.

As will be noted, the present Index is bound in with the first number of a new volume. This can readily be lifted out and bound with the seventeen numbers to which it refers, but if librarians or others desire extra copies they may obtain them without charge by addressing this office.

A LEAF FROM THE GERMAN BOOK

OF late there has been a revival of discussion concerning the need for more technical men in the American dyestuff field, both in the selling and application departments, as well as of service generally, and this, as sooner or later it was bound to do, has brought up the question of executives. For, in the final analysis, it is they who have the power to make or mar an industry, and it is to them that one must apply for recognition of improved methods, changes of policy, the employment of suitable men to carry on the work, and, in general, all that is fresh and vitalizing.

One does not think very far along this line before he is brought face to face with the realization that the American dye industry differs from the German in that the latter is directed by technically trained experts of exceptional ability and complete understanding of the needs of their own industry. They have all had practical experience in the factory and the laboratory, and can sense a weakness almost before it develops. Years of training and a highly specialized knowledge are the only factors which can produce this type of executive, who, in turn, is the only type which can produce one hundred per cent results.

In the American industry, however, while one also finds very able men in charge, in a majority of cases these are not technical men at all, but rather those who have gained their business experience along other lines of manufacture or in the financial field. In view of this, the results which they have accomplished have been remarkable, and before going any further it must be emphasized that there is not the slightest disposi-

tion to find fault or criticise. On the other hand, there should be words of praise for the great work already wrought. What has been suggested, however, is that the time has come when something more is needed. Excellent as the present system is, it could be bettered. It is not one hundred per cent efficient, and with the ever-impending threat of German competition, nothing short of one hundred per cent will be enough.

To the layman, the many reasons why so complex an industry as the dye industry should be guided by technical men are not at once obvious; in all likelihood he could not enumerate them; though, if he thought much about it he would quite probably give this as his verdict "on principle." But to the initiated these reasons are so clear as to need no cataloging. It is not, remember, that the work being done is not good, but that it might be bettered. Something more than efficient management is called for. The industry will require those imaginative qualities possessed by the German "Technische Reisende." In other words, a full knowledge of the *possibilities* is required before new forms of consumer-service, and constructive changes, can be conceived.

When it comes to a question of results, where could one turn for a better demonstration of the maxim that "knowledge is power" than to the German dye manufacturers? There is no question about their results, and there is no question but that when they renew their effort to capture American markets, their service and their production processes will be superior to ours unless the latter are supervised by men of larger technical trainings and broader experience in this particular field. Already we have imported German chemists to show us how to save time in overcoming the countless obstacles which arise in dye making. Why, then, would it not be well to take another leaf out of the German book and emulate their system of placing technically trained men, possessing also in combination great business ability, in the executive offices which control the production and distribution of our dyestuffs?

1922

THE year just ended has been full of disappointment for many. It has seen unemployment grow to unwonted proportions, and that is always a sign of something wrong at the heart of things. Others have been disappointed because it did not realize to the full the joyful predictions of the extreme optimists. But in the end, however, and in all fairness, it may be said that it left us better off than it found us—if not actually, at least in prospect. And that is a great deal.

Early in the year, the slogan "1921 Will Reward Fighters" gained wide currency and considerable popularity. Many acted upon its suggestion and discovered it, on the whole, to be a fairly sound doctrine. Beyond a doubt the art of salesmanship was rediscovered during the last twelvemonth. Those who continued to bemoan their luck got nowhere, while those who went in search of beetter times, found them more often than not. Again, it is true that they did not bring about a return of the floodtide of prosperity enjoyed during the war, but they effectively prevented the threatened stagnation. The condition of the textile mills, in the aggregate, unquestionably improved, and while the public has not yet got completely over its "buying strike," a man with a fair product, at a reasonable price, can to-day count himself better off than he was in the unsettled times of a year ago.

Potentially, the condition of the dye industry is better. It is a long way from being on its feet again, but the important thing is that the turn has been taken and that most of those engaged in this calling know it. The one great blight upon the industry is the continued failure of Congress to settle the dye protection controversy and end the suspense which is keeping research departments inactive and holding back progress. It is utterly idle, vain and futile to repeat once more the shopworn phrase "The time has come for action!" and we shall not attempt it. Congress will pursue its own unresponsive way, whether or no. Nothing can make our legislators realize that the time factor is almost as important as the protection factor in this controversy. Matters will have to take their appointed course in their appointed time; all that can really be done is to ask for and insist upon the rights of dye makers, the dye consumers and the American public being provided for in the final decision.

As we enter the New Year let us, however, resolve to keep what we have already gained and do our part toward attaining the goal of complete readjustment and stabilization—or, in other words, "normalcy."

EXPLANATIONS ARE WANTED

THE charges of Albert M. Patterson, President of the Textile Alliance, Inc., that the United States Department of State was influenced by "present or former German agents" to terminate the existing arrangment for the handling of reparation dye imports by the Alliance, calls for something more than a mere interchange of politely worded resolutions and epistles. Mr. Patterson leaves a great deal to the imagination of those not "on the inside," so to speak. Any one so fearlessly specific as he should furnish more in the way of substantiating detail, or else, in all fairness, keep such statements out of the press until prepared to do so.

In his letter to the various organizations interested in dyestuffs, which is reproduced elsewhere in this issue, he reasons as follows: "As the Department's action was not due to dissatisfaction with the conduct of the affairs of the Alliance, this determination [to terminate the import and distribution arrangement] evidently resulted from the protests made by present or former agents of the German dye manufacturers." And again: "Although it is evident that the Department of State terminated its arrangement with the

Alliance because of the pressure from the present or former agents of certain of the German manufacturers constituting the Interessen Gemeinschaft, nevertheless . . . etc."

And there he rests his case. He does not speak as one fully aware of the extreme gravity of his charge, or of the gravity of setting it thus before the public only to dismiss it without a word. The Department of State is one of the most important in our Government; its head holds the highest office in the Cabinet. It is this Department which Mr. Patterson now declares, with seemingly the utmost confidence, has yielded to the pressure of German agents.

He reasons, in effect: *Since* the State Department was not dissatisfied with the conduct of the Alliance, its decision *must* have resulted from the influence of German agents.

Surely that reasoning is anything but sound as it stands. It assumes but one alternative to dissatisfaction as a cause for the action of the State Department. And if pro-German pressure was the only possible alternative, this fact will be news to many in the dyestuff manufacturing and consuming industries. No; it is perfectly obvious that Mr. Patterson's conclusion was based on something more than the logic which he submits to trade and public. It has all the earmarks of sustained prior expectation and observation. And if this be the case, why, in the name of all that's fair and reasonable, can he not come out with the observations which led him to his conclusion? Having made his charge, he should back it up.

Meanwhile, Assistant Secretary of State Dearing declares that the only reason for the action of his Department was a question as to the legality of its co-operation with the Alliance. And there is this to be borne in mind: The arrangement was begun under another Administration, and, having drawn forth no protests at the time, would naturally be continued while that Administration remained in power. With the advent of a new Administration, accompanied by a complete replacement of Cabinet officers, including the Attorney General, directly concerned with such matters, it is customary that the arrangements of the previous officeholders should undergo a thorough inspection. New minds may place new interpretations upon established rulings, and under such circumstances it is not at all improbable that a question might have been raised as to the legality of the arrangement beetween the State Department and the Textile Alliance. It is almost always thus when one party succeeds another in power; it is expected, and creates no comment. So much for the Government side of the question.

The question of the importation of reparation colors from Germany is an important one, but for once it is transcended. It is wholly irrelevant to the present issue. The REPORTER has endeavored to set before its readers the utterances of both parties, but, pending further revelations, if any be forthcoming, it has no axe to grind and no comment to make save that this matter calls for an investigation. The situation is simply this: The head of a well-known trade organization charges a Government Department with yielding to pressure from foreign agents bent on doing ill to an American industry. The public has been duly notified of this, and now has a right to the facts. Moreover, it will demand the facts, and will permit neither party to withdraw until this charge is proven or quashed. This is no intratrade matter, to be settled quietly and without publicity. It is public property, and as such should become a leading subject for the attention of the Senate investigating committee consisting of Senators Shortridge, Borah and Reed.

ON THE ACTION OF DILUTE SULPHURIC ACID ON COTTON CELLULOSE, AND AN IMPROVED METHOD OF TESTING FOR OXYCELLULOSE

(*Continued from page* 8.)

By similar treatment, using hydrochloric acid of 1.008 sp. g., a product is obtained having a copper number of 5.1.

For comparison an oxidized yarn was prepared by the permanganate process (this *Journal*, 36, 10, p. 251), using sufficient oxidizing agent to supply 1/12 atom of oxygen per cellulose unit, $C_6H_{10}O_5$. For this purpose 10 grams of cotton yarn were immersed in a solution of 0.33 gram of potassium permanganate in 10 deg. Tw. sulphuric acid. This was freed from manganese and thoroughly washed. Its copper number was 5.3.

Although the copper numbers of the above products are in fair agreement, the result of the acid treatment is to destroy the fibrous nature completely, whereas the oxidation process resulted in a much less severe action. The product was still fibrous, but its breaking strength was reduced to 28 per cent of its original value.

All the products gave a yellow color on boiling with N/2 caustic soda, with some loss in weight; the action was, however, much more pronounced in the case of the oxidized yarn.

The treated yarns were then dyed in Methylene Blue and the amounts of dyestuff left behind in solution estimated quantitatively by means of titanous chloride, the amounts taken up by the fiber being arrived at by difference. Untreated cotton was dyed under identical conditions for comparison.

Product Examined	Percentage of Methylene Blue Fixed
1. Bleached cotton	0.338
Sulphuric acid-treated cotton	1.004
Oxidized cotton	0.747
2. Bleached cotton	0.345
Hydrochloric acid-treated cotton	0.282
Oxidized cotton	0.761

These quantitative results illustrate numerically the similarity between oxidized and sulphuric acid-treated

cellulose. The product obtained by the action of sulphuric acid on cotton behaves like the product of oxidation also with regard to its dyeing property with direct cotton dyes, in that they both resist these colors to an extent depending upon the degree of modification.

On account of this similarity the following experiment was carried out to determine whether any oxidation takes place by the sulphuric acid treatment:

Calico was spotted with a 5 per cent solution of sulphuric acid, placed in a flask on a water bath, and heated in an atmosphere of carbon dioxide until dry. The gases from the flask were passed through a very weak solution of iodine. As no action was observed, this was regarded as an indication that no sulphurous acid was formed, but the product nevertheless possessed the increased affinity for Methylene Blue. Since the action takes place out of contact with atmospheric oxygen, and as no sulphuric acid is reduced, oxidation cannot have taken place and the product cannot be an oxidized cellulose.

Another sample of sulphuric acid-tendered cotton was boiled in water for an hour and in N/2 caustic soda for an hour. This was then thoroughly washed by boiling with water. Sulphur was still present in the residual fiber. Even when the alkali treatment was extended to a boil of four hours and the mass allowed to stand overnight in the alkaline liquor, there was still sulphur present.

Estimation of Fixed Sulphur.—Five grams of calico, wetted with its own weight of 2N sulphuric acid was dried at 40 to 45 deg. Cent. for two hours. It was then boiled for half an hour in distilled water, and for half an hour in 500 cc. of N/10 caustic soda, being thoroughly washed again by boiling in water for an hour. The mass was dried and the sulphur estimated. To this end the dried product was dissolved in nitric acid (sp. g. 1.5), and the solution after dilution neutralized by addition of caustic soda solution. This was evaporated to dryness in a silver dish and the temperature raised until combustion took place slowly but completely. The residue, when quite white, was taken up with water, nitrates removed by evaporating down with hydrochloric acid, and the sulphate present estimated by precipitation as barium sulphate.

The sulphur present expressed as sulphuric acid amounted in one case to 1.14 and in another to 0.97 per cent on the weight of the original cellulose.

The action which takes place when dilute sulphuric acid is dried into cotton is of a twofold character. The cellulose is partially hydrolyzed, which results in a reduction of the strength of the fiber, and there is also a fixation of some of the acid which behaves as a mordant for basic colors. By drying 1 to 10 per cent solutions of sulphuric acid into cotton, both these actions take place the product being tendered and possessing a very great affinity for Methylene Blue, Rhodamine B, Crystal Violet, etc., even after prolonged washing with water and alkali. It has very little affinity for direct colors, notably Diamine Sky Blue. It was indicated by Harrison that the increased affinity for Methylene Blue did not depend on the degree of tendering. It has now been found possible to separate these two actions. Thus, if cotton is boiled with sulphuric acid of ½ per cent strength for an hour, its strength is impaired but its affinity for Methylene Blue is not increased but slightly diminished. No sulphuric acid is fixed. Cotton which has become tendered without having its affinity for basic colors increased may therefore be produced by hydrochloric acid or by prolonged exposure to hot weak sulphuric acid, which is not allowed to concentrate. Tendering by oxidation or by allowing weak sulphuric acid to dry into cotton results in an increase in affinity for Methylene Blue.* Moreover, it has been found that cotton modified by drying-in sulphuric acid has a marked affinity also for the leuco compounds of Methylene Blue, Crystal Violet, etc., whereas in the case of oxidized cellulose this affinity is only just perceptible. The behavior of the two products towards direct cotton colors (Diamine Sky Blue is very suitable) after treatment with caustic alkali serves to distinguish between them. Both oxidized and sulphuric acid-treated cotton resist the dyeing with Diamine Sky Blue, but if boiled for half an hour with 5 per cent caustic soda, the affinity in the case of oxidized cellulose is restored, whereas the slight affinity of the sulphuric acid product is not altered.

Summary

1. Cotton which has acquired an increased affinity for Methylene Blue and a decreased affinity for Diamine Sky Blue by treatment with dilute sulphuric acid is not oxidized cellulose, but contains fixed sulphur which is not removed by washing with boiling water or alkali.

2. The characteristic affinity of Chardonnet silk for basic colors is due to the sulphur (or sulphuric acid) fixed during the nitration with mixed acids and not during denitration.

3. The affinity of oxidized cellulose for leuco Methylene Blue is very slight, whereas it is very marked in the case of the sulphuric acid product.

4. Oxidized cellulose and sulphuric acid-treated cellulose may be distinguished by boiling with weak alkali and dyeing with a direct color (Diamine Sky Blue).

With a capital of $5,000 the Bronman Fur Dressing Company has been incorporated under the laws of New Jersey to manufacture, buy, sell, import, export, prepare, dress, tan, dye and deal in and trade in all or any kinds of furs, pelts, skins and hides, as well as to manufacture and deal in fur goods and garments, and leather goods. Headquarters of this new firm will be located in Newark.

J. E. Coplin, formerly of the Muscogee Manufacturing Company, Columbus, Ga., has become Overseer of Dyeing for the Deep River Mills, Randleman, N. C.

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*The affinity of oxidized cotton for Rhodamine B is only slightly greater than that of ordinary cotton, whereas the sulphuric acid product dyes a very heavy shade.

DECLARES U. S. DEPARTMENT WAS INFLUENCED BY GERMAN AGENTS TO END REPARATION DYES AGREEMENT

Head of Textile Alliance Openly Charges Pressure Was Brought to Bear—Dearing Asserts Question of Legality Was Only Cause—Woolen and Cotton Men Ask Protection Against Alleged Move of I. G.

DEVELOPMENTS of the past week in the situation created by the termination of the arrangement between the U. S. Department of State and the Textile Alliance, Inc., with headquarters in New York City, whereby the latter has been handling this country's allotment of reparation dyestuffs in conjunction with the Government Department, included the assertion by Assistant Secretary of State Dearing that the lack of legal authority only was the cause for terminating the arrangement, which has continued for two years; and the issuing of a circular letter over the signature of Albert M. Patterson, President of the Alliance, in which the latter asserts that the action of the Department was prompted by the influence or pressure of present or former agents of the Interessen Gemeinschaft.

No reasons are given by Mr. Patterson for this conclusion, but the statement, at least, is very positive, and occurs several times throughout the letter, which has been sent broadcast among the various associations of dyestuff consumers as an appeal for support and concerted action to prevent the lapsing of the United States option on our percentage of the German reparation dyes as determined by the Versailles Treaty.

Resolutions were passed by the American Association of Woolen and Worsted Manufacturers and the National Association of Finishers of Cotton Fabrics urging support for the Alliance and calling upon the Government to prevent the distribution of reparation colors through private firms. Copies of these resolutions, as well as a pertinent extract from the minutes of a meeting of the Board of Directors of the Alliance, held to discuss the State Department's move, accompany the letter, which follows:

"The Department of State on December 14, 1921, informed the Alliance that the existing arrangement for the importation and distribution of German reparation dyestuffs should be terminated. As the Department's action was not due to dissatisfaction with the conduct of the affairs of the Alliance, this determination evidently resulted from the protests made by present or former agents or representatives of the German dye manufacturers. The Department considers that the conclusion of the arrangement will not affect, so far as it is concerned, the carrying out of existing contracts by the Alliance relative to the importation and distribution of dyestuffs from the Reparation Commission by the Alliance. It has conveyed that information to the Reparation Commission.

The Alliance has been importing the dyes which were allotted to the United States under the terms of the Treaty of Versailles. The purpose of the reparation provisions of the treaty was to provide the allied countries with those required types of dyes not made by their domestic manufacturers upon such terms as to price and delivery as would enable them to compete with their German consumers of similar dyes and safeguard them from attempts on the part of German dye manufacturers to impose excessive prices to favor their own consumers of dyes or otherwise to exploit a substantial monopoly of a large part of most valuable and expensive colors.

Has Imported 2,587,665 Pounds of Dyes

"In performing this work the Alliance has in about two years imported 2,587,665 pounds of dyes, to the value of $7,508,533.08, a large part of which were sold at actual cost. The remainder the Alliance was obliged to secure, under authority from the Department of State, by an outright purchase, as they would have otherwise been lost to the United States to the detriment of the American consumers. To make this purchase and to provide for the charges which would accrue an underwriting syndicate became necessary which was composed of concerns and individuals who guaranteed the necessary amount of money upon the understanding that any excess of receipts over expenditures would be devoted to educational and charitable purposes. From this class of dyes the Alliance has accumulated a fund of $1,314,315.59, which is in cash and Government securities, and has on hand 499,566 pounds of dyes of considerable value.

"It is considered essential by those familiar with the dyestuff situation that some other arrangement for the continued importation of the reparation dyes should now be made in order that the consumers may avail themselves of this low-priced source of supply and thus be protected against the recurrence of the abuses of the German dye monopoly, of which certain evidences are already obvious to those connected with the consuming trades.

U. S. May Have to Buy Reparation Colors in Open Market

"I have urgently recommended to the Department of State on several occasions that no association or corporation under private management should perform these services, even though it be done without profit and solely in the interest of the trades. I have urged that the work be done by a Government Department, preferably the Tariff Board, but have each time been met by the statement that neither the Tariff Board nor any other department has the funds, organization nor authority to do the work. If these services are not performed, the supply of reparation dyes for the United States will cease and

they will be apportioned among the Allied or Associated Governments, or revert to the German manufacturers, who will be in position to sell them here through their agents at excessive prices.

"Although it is evident that the Department of State terminated its arrangement with the Alliance because of the pressure from the present or former agents of certain of the German manufacturers constituting the Interessen Gemeinschaft, nevertheless it is now understood that these same agents are now making representations to the State Department for the purpose of securing such reparation dyestuffs as that department might secure and are attempting to re-establish in the United States the monopoly which the I. G. enjoyed prior to the war.

Tells of Former Attempt

"In the latter part of last year a similar attempt was made when the same German agents, or some of them proposed that an agreement be entered into between the United States Government and eight of the largest German dye concerns which would give those concerns the exclusive right to the distribution of German dyestuffs in the United States through their own agents. This proposal was submitted to the Dye Advisory Committee of the War Trade Board Section of the Department of State, which advised the rejection of the proposal for the reasons, among others, that the plan suggested would result in a monopoly, owing to the fact that the German manufacturers referred to were all members of the I. G. and that such an arrangement would be against general public policy and particularly against the interests of American consumers of dyestuffs.

"At a meeting of the Board of Directors of the American Association of Woolen and Worsted Manufacturers held on December 6 I informed the Board that it had been intimated that the Department of State would wish to terminate the arrangement, and explained the situation which existed. The Board thereupon adopted a resolution which approved the supervision of the importation of these dyes by a Government agency, or if that was not practicable that it should be entrusted to the Textile Alliance, Inc., or some other similar non-profit organization of the consuming trades. A certified copy of that resolution was sent to the Department of State, and a copy is enclosed herewith.

"At a meeting of the Board of Directors of the Alliance held on December 8, 1921, a resolution was adopted to the effect that the Alliance should oppose all efforts to interfere with or stop the importation of these reparation dyes and that it should present the situation to the various associations and consuming interests in order that they might be given an opportunity to immediately make proper representations for the continuance of the importations of these dyes through contact with members of Congress, governmental departments, newspaper publicity, and such other means as might be available to the officers of these associations. A copy of the preamble and the resolution is attached to this letter.

"A report was made by Andrew C. Imbrie, a director of the Alliance, to the National Association of Finishers of Cotton Fabrics, the association which he represents upon the Board, at a meeting held on the fourteenth day of December, 1921, after which a resolution was adopted recommending the continuation of the work of the Alliance and expressing its desire that the Department of State should intimate to the Reparation Commission that it will be agreeable to the United States Government to have the commission deal directly with the Textile Alliance, Inc., in its private capacity, or if such definite recommendation cannot be made, then the Reparation Commission be requested to continue to deal exclusively with a non-profit retaining organization of dye consumers. A copy of that resolution was sent to the Department of State, and a copy is herewith enclosed.

"Through their own nominees on our Board of Directors, the American Association of Woolen and Worsted Manufacturers, the National Association of Finishers of Cotton Fabrics, and other individuals who are largely interested as consumers, have requested the Alliance to continue this work, it is still doubtful whether it has such a right until after a majority of the Board of Directors shall express the sentiment of the various associations which they represent.

"It is urgent that your association should express its opinion as to whether it approves of the Textile Alliance, Inc., or some other non-profit making association of the consuming trades securing desirable types of reparation dyes, which are available to the United States and thus providing for a continued source of supply at reasonable prices, or permit the option which the Reparation Commission has given the United States to lapse and the dyes be apportioned among the Allied and other associated powers, or revert to the German manufacturers, thus permitting them or their agents to regulate prices with the assurance that no non-profit association is able to make lower quotations."

The foregoing is the substance of the letter which was signed by Albert M. Patterson, president of the Textile Alliance, Inc. The enclosures accompanying the letter were as follows:

Woolen and Worsted Men Against Allowing Option to Lapse

Copy of a resolution adopted at a meeting of the Board of Directors of the American Association of Woolen and Worsted Manufacturers at a meeting held in New York, Tuesday, December 6, 1921:

"Whereas, It has come to our attention that a change is contemplated in the methods of dealing with the importation of reparation dyes from Germany, it is

"Resolved, That the continued importation of these dyes is essential and necessary to the woolen and worsted industry, and it is further

"Resolved, That supervision of these importations by a Government agency should be continued, or, if that is not practical it should be entrusted to the Textile Alliance,

Inc., or other similar non-profit making organization of the consuming trades.

(Signed) "J. J. Nevins, Secretary."

Alliance Appeals to Member Firms for Support

Excerpt of minutes of meeting of the Board of Directors of the Textile Alliance, Inc., held on December 8, 1921:

"The president of the company advised the board that on December 2 he had been called to Washington for a conference with F. M. Dearing, Assistant Secretary of State, and that Mr Dearing advised that the Department of State feels that there is not sufficient legal ground for the existing arrangement between the Department of State and the Textile Alliance, Inc., and stated that it is the desire of the Department to terminate the arrangement under which the Textile Alliance, Inc., is importing and distributing reparation dyestuffs and to be relieved of all responsibility in connection therewith; that it is not the desire of the Department of State to take any drastic action that will preclude the possibility of consumers in this country obtaining in the future, as in the past, reparation dyestuffs at reasonable prices; that Mr. Dearing made it plain that the desire of the Department to terminate the arrangement is based purely on legal grounds, and stated that the Department is in no respect dissatisfied with the Textile Alliance, Inc., as the relationship between the Department and the Textile Alliance, Inc., has been pleasant and entirely satisfactory, and it is the opinion of the Department that the operations of the Textile Alliance, Inc., have been generally satisfactory to the trade; and Mr. Dearing stated further that it is his opinion that there is no probability of an arrangement being perfected under which reparation dyestuffs might be imported and distributed by the Treasury Department, Tariff Commission or other governmental department. Mr. Dearing was advised that the Textile Alliance could continue the purchase, importation and distribution of reparation dyestuffs in its private capacity, provided the Department of State would indicate to the Reparation Commission its approval of the continuance of sales to the Textile Alliance, Inc., of reparation dyes.

"It was the opinion of the President that the desire of the Department of State to be relieved of financial responsibility and to cancel the existing arrangement between the Department and the Textile Alliance, Inc., is due to activity on the part of certain agents for German dye manufacturers.

"Instructions were requested as to whether or not the Textile Alliance, Inc., shall continue the importation and distribution of reparation dyes, if the opportunity presents itself, without direct governmental support and sanction or agreement for governmental supervision, and if so should the Textile Alliance, Inc., carry its advocacy to the point of creating antagonisms and jeopardizing its relationship with the Department of State. On motion, duly seconded it was

"Resolved, That it is the sense of this meeting that the Textile Alliance, Inc., should preserve at all costs its friendly relations with the Department of State, but that for the protection of the dye consumers in the United States it should actively and energetically oppose all efforts to interfere with or stop the importation and distribution of reparation dyes; that it should present the situation to the various associations and consuming interests in order that they may be given an opportunity to immediately make proper representations for the continuance of the importation of these dyes and that such representation should be effected through contact with members of Congress, governmental departments, newspaper publicity, and such other means as may be available to the officers of these associations. It was further

"Resolved, That Franklin W. Hobbs and Henry B. Thompson, together with one member to be named by the Silk Association of America, be named a committee with full power to make use of the services of Messrs. Coudert Brothers, counsel for the Textile Alliance, Inc., and the services of Chas. H. Stone, agent, and E. A. Macon, secretary, of the Textile Alliance, Inc., in the conduct of this work."

Cotton Finishers Ask that Alliance May Continue Service

Copy of resolution adopted by the National Association of Finishers of Cotton Fabrics at a meeting held in New York, Tuesday, December 13, 1921:

"Whereas, The National Association of Finishers of Cotton Fabrics learns that, at a recent conference between the officers of the Textile Alliance, Inc., and the representatives of the Department of State, it was intimated that the Department wished to terminate the present arrangement with the Alliance by which German reparation dyes have been imported and distributed to American consumers.

"Whereas, Having experienced the satisfaction of dealing with a disinterested and officially authorized agency operated for the benefit of consumers and under no necessity of making a profit, the members of this Association cannot regard with equanimity the possibility of being again subjected to the abuses, unreasonable exactions and deceptions which were practised prior to the war by the agents or representatives of the German dyestuffs monopoly; therefore, it is unanimously

"Resolved, That this Association, including in its membership sixty-two plants engaged in the business of bleaching, dyeing and printing silk and cotton piece goods, desires to record its approval of the service rendered by the Textile Alliance, and its conviction that such an agency should continue to function in the interests of dye consumers. Also be it

"Resolved, That in the event of the Department's deciding to terminate the present arrangement and if no other governmental department is in a position to assume responsibility for these transactions, this Association earnestly hopes that the Department of State will feel justified in intimating to the Reparation Commission that

it will be agreeable to our Government to have the Commission deal directly with the Textile Alliance in its private capacity. If the Department, for any reason, cannot make so definite a recommendation, then we urge that the Commission be specifically requested to continue to deal exclusively with a co-operative non-profit retaining organization of dye consumers. It is further

"Resolved, That the secretary of the Association be directed to forward the foregoing statement to the Department of State at Washington."

Italian Dye Industry Makes Slow Progress Against Heavy Odds

By RAFFAELE SANSONE

Genoa, December 5.
Special to The REPORTER.

THE demand for dyestuffs, although still limited owing to the crisis prevailing in the textile, paper and leather industries, was very fair because of the many manufacturers preparing stocks in the anticipation of increased activity later on. The demand for wool colors, owing to the greater demand for dyed woolen goods, became more pronounced, though nothing in comparison to what had been anticipated.

Germany, observing that the continued fall in the value of the mark was causing a growing tendency on the part of the buyers to speculate—the latter making it a practice to hold up orders until the last possible moment; and apprehending a further decline, proceeded to place special export prohibitions on German goods which had not been ordered and paid for in Italian lire. This state of affairs did not affect the prices of artificial dyestuffs during November; but did influence, however, those chemicals which were urgently needed, raising the prices slightly.

The Italian dyestuff industry itself went through difficult moments, and matters were ill for the *Unione Produttori e Consumatori Materie Coloranti Artificiali* (Union of the Producers and Consumers of Coal-tar Colors), the formation of which was told of in The REPORTER of September 26. This association, which had its headquarters at Milan, was forced to liquidate, being no longer in a position to continue its useful work. All old and new dyestuff firms had great difficulty in competing against some of the German reparation products, and against other imported products from Germany and other countries. This, in spite of the Italian import prohibitions. The other foreign products had, as usual, the monopoly of the market, owing to the difficulty which is still experienced in obtaining formulae, plants, chemists and operatives. During its recently completed fiscal year the color works known as *Fabbriche Italiane Materie Coloranti Bonelli* lost 2,000,000 lire on a capital of 30,600,000 lire.

These conditions are, however, no novelty, and despite them there was a steady, if slow, progress in the Italian color and intermediates industries. This can be demonstrated by the following facts:

TABLE OF COMPARATIVE VALUES REFERRED TO ON PAGE 29

100 Kilos	November (Lire)	November (Dollars)	October (Dollars)
Naphthol Yellow	50,000- 70,000	2,040-2,857	2,083-2,916
Auramine	70,000- 80,000	2,857-3,265	2,916-3,333
Orange II	30,000- 35,000	1,224-1,428	1,250-1,458
Nigrosine, water soluble	30,000- 40,000	1,224-1,632	1,250-1,666
Nigrosine, soluble in alcohol	35,000- 40,000	1,428-1,632	1,458-1,666
Sulphur Black	7,000- 10,000	285- 408	291- 416
Acid Black	35,000- 40,000	1,428-1,632	1,458-1,666
Direct Black	35,000- 40,000	1,428-1,632	1,458-1,666
Chrome Black	40,000- 45,000	1,632-1,836	1,666-1,875
Methylene Blue	80,000-100,000	3,265-4,080	3,333-4,166
Direct Blue	25,000- 30,000	1,020-1,224	1,041-1,250
Sulphur Blue	45,000- 50,000	1,836-2,040	1,875-2,083
Malachite Green	80,000-100,000	3,265-4,080	3,333-4,166
Acid Green	60,000- 70,000	2,448-2,857	2,500-2,916
Direct Green	50,000- 70,000	2,040-2,857	2,088-2,916
Bismarck Brown	40,000- 50,000	1,632-2,040	1,666-2,083
Fuchsine Crystals	70,000- 80,000	2,857-3,265	2,916-3,333
Eosine	60,000- 70,000	2,448-3,265	2,500-3,333
Ponceaux	35,000- 45,000	1,428-1,836	1,458-1,875
Methyl Violet	70,000- 80,000	2,857-3,265	2,916-3,333

The imports of benzol, toluol, and xylol reacheed 105 tons during the first six months of this year, against 14? tons in 1920, and 1,064 tons in 1919, during the same period; besides 45,984 of raw benzine imported during the same six months. The supplies of such first products came principally from the United States, although in 1919 they had come principally from England (986 tons from England and 77½ tons from the United States).

The following importations were also noted during the first six months of this and preceding years: About 1 ton of benzoic acid was imported, against 6½ tons in 1920, and 2½ tons in 1919; 67 tons of nitrobenzine, against nothing during preceding years; 23½ tons of aniline and its sales (exports 45 tons), against nothing during the preceding years; the imports of acetone only reached 9 hectolitres, against 320 in 1920, and 8,923 tons in 1919; this product no longer coming from the United States (which exported to Italy 309 hectolitres in 1920, and 8,923 hectolitres in 1919). The exports of this product from Italy reached 1,461 hectolitres, against 54 hectolitres in 1920 and 12 hectolitres in 1919.

From the above it will be seen that the enforced manufacture of dyes and dyestuff intermediates brought about in Italy a certain production of aniline and its salts which was partly sold to the dye works for the production of Aniline Black, was partly sold to the color works for producing colors, and was partly exported. In this way Italy came to export more aniline oil and salts than were imported. With acetone the same took place.

Prices of Coal-Tar Colors.—The quotations given in the Table (p. 28) per 100 kilos in lire and dollars, show the differences brought about by the fluctuations in foreign money, which changed in November the United States dollar from a value of 24.50 lire to a value of 24 lire, and the English pound sterling from 96 lire to 98 lire. The German mark fell from 0.12 lire to 0.08 lire, and even lower, rising slightly after this.

Dyewood Extracts.—The demand for extracts was still good. Logwood extract was, however, the product mostly demanded, and this principally for printing cotton fabrics, dyeing silk fabrics and manufacturing ink. In wool dyeing it was mostly substituted by acid blacks, coming from Germany and other countries. The demand on the part of textile concerns, paper works and tanneries for other dyewood extracts was still small, owing to the difficulties through which these are passing.

Mordants, Assistants, Dyehouse Products, Etc.—The demand for mordants and other dyehouse products, besides coloring matters, was very fair, and dearer German quotations contributed in raising some of the prices. Some of the changes noted during November being as follows per metric ton on the Milan market: Acetate of alumina rose from 125 lire to 160; chrome alum remained at 300 lire; bichromate of potash remained at 600 lire; ferrous sulphate remained at 50 lire; copper sulphate remained at 250 lire; tartar emetic remained at 1,300 lire; aniline oil remained at 1,000 lire; white refined glycerine rose from 650 lire to 850; glucose, 45 deg. Be., remained at 260 lire; hydrogen peroxide remained at 210 lire; tannic acid, 60 per cent, remained at 2,000 lire; tartaric acid crystals remained at 1,075 lire; acetic acid, 30 per cent, remained at 300 lire; hydrochloric acid, 20 to 21 deg. Be., remained at 32 lire; formic acid rose from 800 lire to 900; lactic acid, 80 per cent, remained at 400 lire; alum fell from 140 lire to 135; ammonia, 22 deg. Be., remained at 155 lire; bisulphite of soda, 32 deg. Be., remained at 45 lire; chlorate of potash fell from 370 lire to 345; chloride of ammonia remained at 450 lire powder remained at 90 lire; nitrite of soda remained at 300 lire; yellow prussiate of potash remained at 1,300 lire; yellow prussiate of soda remained at 900 lire; caustic soda, 76 to 78 per cent, rose from 280 lire to 340; silicate of soda, 140 deg. Tw., remained at 100 lire; sodium rose from 280 lire to 325; logwood extract remained at 1,000 lire; yellow dextrine remained at 425 lire; white dextrine remained at 430 lire; farina (potato starch) remained at 340 lire; Kordofan gum remained at 500 lire; Indigo, 25 per cent, remained at 2,000 lire; betanaphthol rose from 1,200 lire to 1,800; industrial castor oil remained at 580 lire; zinc powder remained at 550 lire. The dollar was worth, at the time of these quotations, 24 lire.

NATIONAL ISSUES 1922 "DYER'S FORMULAS" FOR USE WITH SPRING SEASON COLOR CARD

In line with its policy of providing a helpful and personal service for dye users, the National Aniline & Chemical Company has again come to the fore with a series of instructions for producing hues standardized by the Textile Color Card Association of the United States. The present edition of "Dyers' Formulas" is a thirty-two page booklet, uniform with others of this series, for use in connection with the 1922 Spring Season Shade Card of the Association, and copies may be obtained by addressing any of the company's branches, or the main office at 21 Burling Slip, New York City.

The matching of these colors, in the laboratories of the company, on cotton, wool and silk, required the preparation of thousands of experimental formulas, and the results now offered to the trade are the outcome of painstaking and elaborate elimination trials which would be beyond the power and resources of many dye users to carry out in their own works. Great care has been exercised in the selection of the several dyes named, and the company states that dyers may have confidence, if recommendations are closely followed, that proper results will be obtained.

Seventy-one formulas are given for silk, seventy-one for cotton, and eighty-five for wool. In the case of each the quantities of dyes and assistants mentioned are for 100 pounds of material. For cotton colors two methods are given, one for the use of direct dyes on cotton, for light shades and for medium and deep shades; and one for basic dyes on cotton, for light shades and for medium and full shades.

"Dyer's Formulas," should find favor with the dye user and a place on his laboratory shelf.

MEN OF MARK
in the
DYESTUFF FIELD

M. L. CROSSLEY
Chief Chemist
The Calco Chemical Co.
Bound Brook, N. J.

M. L. CROSSLEY was born July 3, 1884, in Saba Island, Dutch West Indies, of American parents. He received his early education in the Dutch West Indies Academy, and later completed his secondary school education in the United States. He was graduated from Brown University in 1909 with the degree of Bachelor of Philosophy, completing the four years' course in three years. Continuing graduate study at Brown, he received the degree of Master of Science in 1910 and the degree of Doctor of Philosophy in 1911.

During the period of 1909-1911 he was Instructor of Chemistry at Brown under Prof. John Howard Appleton. It was through Professor Appleton that he first became interested in the chemistry of dyes, being associated with him for two years in research on the relation of constitution to color in dyes of the anthraquinone series. With Professor Appleton he made an exhaustive study of vat dyes, and simultaneously conducted an investigation in biological chemistry on the relation of Creatinine to body metabolism. As a result of his work and training, he is prepared to teach either biology or chemistry.

Leaving Brown, he became Associate Professor of Organic and Biological Chemistry at William-Jewell, Liberty, Missouri, during the period of 1911-1913; was Associate Professor of Organic Chemistry at Wesleyan University, Middletown, Connecticut, 1913-1914, and acting head of the Department of Chemistry at Wesleyan, 1914-1918. In July, 1918, he gave up teaching to assume his present position as Chief Chemist of the Calco Chemical Company.

His research work during the years 1911-1918 was in several fields, particularly in the relation of constitution to color, the effect of toxins on nerve metabolism, and the relation between chemical constitution and physiological properties.

He was a member of the Eighth International Congress of Applied Chemistry, and is a Fellow of the American Association for the Advancement of Science, a member of the American Chemical Society, of the Society of Chemical Industry, and of the Societe de la Chimie et Industrie. He was President of the Connecticut Valley Section of the American Chemical Society 1916-1918, and is the author of several papers on scientific and educational subjects.

INQUIRY DEPARTMENT

All classes of chemical work or advice relating to artificial colors, natural dyestuffs, dyewoods, raw materials, extracts, intermediates, crudes, or dyeing chemicals and accessories in general, will be carried out for readers and subscribers of the AMERICAN DYESTUFF REPORTER by this department.

Inquiries of a minor character will be answered on this page, while major matters involving personal investigation, analyses, perfected processes and working formulas, will, if desired, be treated confidentially through the mails. In answering inquiries which, by their nature, require reference to the products, processes or apparatus of some particular manufacturer we aim to be absolutely impartial. We refer the inquiries to specialists whom we believe to be best qualified to answer them intelligently, and must disclaim responsibility if their reports show unintentional bias. All questions, materials for analysis or letters leading to the opening of negotiations for special work will receive prompt attention if addressed to Inquiry Department, American Dyestuff Reporter, Woolworth Building, New York City.

D. Q.—*Question:* We are anxious to secure a formula for dyeing Aniline Black on cotton and silk piece goods without tendering the material. Any information you can give us will be greatly appreciated.

Answer: Make up two solutions, as follows: (a) 132 pounds aniline salt in 55 gallons water; (b) 55 pounds chlorate of soda and 12 pounds of copper sulphate boiled in 55 gallons of water. Equal parts of (a) and (b) are used for the first bath and enough water added to bring the solution up to 6 deg. Be. The goods are then run cold four times. They are then put in the aging box and aged for an hour. The air should be very moist in this operation. The goods are then after-chromed with bichromate of soda or potash, on the basis of about 4 pounds of the chemical per 500 yards of goods. They are run through four times, then soaped and rinsed.

F. E.—*Question:* What is the cause of dyed materials changing their tone of color in artificial light, and how can it be prevented?

Answer: The reason lies primarily in the properties of the individual dyes used in making the original shade. A good example is that of Acid Violet 4B. This dyestuff has a shade which does not correspond to any simple color of the spectrum (monochromatic light), but is the resultant of a number of blue rays and certain red rays. The artificial light, being deficient in blue and green rays, causes the loss of these in every object illuminated, and hence the red and yellow effects are intensified and the material dyed with Acid Violet 4B becomes very much redder under artificial light. Almost every dyestuff is affected to a greater or lesser degree, but there are a few that only seem to become flatter and consequently the color tone appears almost unchanged. Bright, intense blues and greens, like Patent Blues and Acid Greens, appear brighter and greener, and yellows are intensified. Bearing these facts in mind, the dyer must use combinations in which these effects offset one another, so that the only effect under artificial light will be that of dulling of shade without alteration of tone. As we naturally expect a duller shade with less illumination, we are then not conscious of any alteration in the color. In many cases color changes under artificial light are of no consequence, but when trimmings are expected to match dress goods, and when the design of a carpet depends on color harmony, it would be a fatal defect to have a change take place in artificial light. The selection of the proper dyes in this case is even more a matter of skill on the part of the dyer than the matching of the original shade.

E. R. S.—*Question:* In dyeing worsted cloth with unresisted silk stripes with chrome colors, we sometimes clear the white silk with hydrosulphite or blankit. Is this always a safe thing to do, or will it injure the color of the worsted?

Answer: The action of hydrosulphite, or its purer variety, blankit, toward colors is like any other chemical reaction; but on account of the stain on the silk being light in shade and only loosely affixed, it seems to expend itself on the silk first before it affects the wool. It may be possible, by using a small amount of hydrosulphite and a temperature not over 130 deg. Fahr., to carefully regulate matters so the action is stopped as soon as the silk is cleared. Even then a slight amount of the wool color will have been stripped from the surface of the fibers, but the amount will be too slight to be noticeable. If the action is prolonged by the use of too much hydrosulphite or too long time or high temperature, the wool will suffer proportionately. This refers to color only. There is practically no tendering of the fiber, and if all traces are washed out there will be no later action.

I. D.—*Question:* What is the most practical way of dyeing silk and cotton hosiery in two-color (heather mix) effects that will stand washing?

Answer: The one really practical way is first to boil off the goods, and then dye the hosiery in a cold, concentrated bath with sulphur colors in the presence of 5 per cent of glue. After washing, the silk will be white and should be cross-dyed with such acid dyes as best resist washing. This method gives the most brilliant silk effects and will wear much longer than any dyeings made with direct or developed colors.

L. S. T.—*Question:* What class of dyes furnishes the best wood stains for high-grade work?

Answer: As water stains will raise the grain of the wood and make sandpapering necessary before varnishing, and as oil stains will always interfere with the proper drying and hardening of the varnish, we believe spirit stains to be the most practical. A spirit stain should be made with denatured alcohol, a small quantity of shellac and dyestuffs that dissolve without residue. Such a stain will penetrate far below the surface and, when protected by varnish, be resistent to light and water to a degree that would hardly be expected.

Review of Recent Literature

Presence of Acids in Cloth. Thomas Hadfield; "The Textile Manufacturer," November 15, 1921, p. 340.

Author states that the question of acid in cloth is a very important one, and also one on which many manufacturers are very slack. The quality and finish of many cloths could be improved if this matter were properly looked after. The acids finding their way into cloth during manufacture are chiefly sulphuric and hydrochloric acids; but other acids are often found in cloths through the ingredients used in sizing, bleaching, dyeing and finishing. If the materials used in the various processes of manufacture were tested periodically for impurities, much trouble would be avoided in finishing, and ultimately there would be fewer complaints to the seller of the finished cloths.

The author declares that all sized fabrics, either light, medium or heavy, have at one period of their manufacture a varied amount of acid present, and even minute traces of acid in the presence of moist air will cause defects in the fabric; and these defects become more obvious when the fabric is made into wearing apparel. Very delicate shades of silk may be injured by long contact with other cloths containing acids. Metallic articles are also soon tarnished. Sulphuric acid remains for years, continually regenerated by the moisture of the air, and slowly causes destruction of the fabric. Fabrics made from vegetable fibers, as cotton, linen, jute, ramie, etc., are naturally slightly acid, as the fibers when tested in their pure state denote acidity with Congo-red. Animal fibers are generally alkaline when in the pure state.

From tests made over a considerable period, varying from three weeks to three years, it has been found that heavily sized cloth gains in acidity more than pure-sized cloth, and the destructive action is more evident. Details of these tests, together with results, are given. Conclusions were that, as regards the effect upon the fabrics of the presence of mineral acid, even in traces the acids weaken the cloth and make it less able to resist friction and climatic conditions. The effects are much more strongly marked with sulphuric acid than with hydrochloric acid. The former acid may ultimately effect a complete disintegration of the fabrics. Further, the conversion of the cellulose into hydrocellulose is not necessarily accompanied by any diminution in the amount of the hydrating acid present. Cloths dyed with fugitive colors are soon affected, reducing the value of the cloth, which has ultimately to be sold at a loss.

To test for free acid, 2 grams of the cloth are weighed, cut into small pieces and exhausted with warm water; the extract is titrated with deci-normal caustic soda, and as an indicator phenolphthalein is used. In some cases repeated extractions are necessary to get out all the acid. In order to confirm the volumetric analysis it is necessary in some cases to have a precipitation test with barium chloride.

Congo-red is chiefly used as a test, as its color is only changed by free mineral acids, and not by alum having an acid reaction, and this test is sufficient for any class of cloth, as the reaction is so sensitive; any perceptible change denotes the presence of acid.

Some Uses of Hypochlorites in Textile Mills. Rideal and Evans, "Journal of the Society of Chemical Industry."

Numerous bleaching methods have been proposed where the action is accelerated by the addition of some form of acid to the bleaching solution. Outside of the paper industry these have been little used, presumably because the reaction is so much more rapid and gets "out of control."

Such methods do appear, however, to have a use in textile mills where bleach is used for purifying water or similar purposes. Hypochlorites are largely used for bleaching, sterilization of drinking water, treatment of water for textile finishing to prevent growth of algae and consequent stains, and addition to water of swimming pools.

Oxidizing agents in general react more powerfully in the presence of acids, and this observation is checked by electrical measurements. Chlorine in acid solution ranks with the most powerful oxidizing agents and in alkaline solution with some of the weaker. It is not generally known that a comparatively slight change in the acidity of a water will make a marked change in the oxidizing activity of the hypochlorite added to it.

The suggestion is made that alkaline water should be treated with acid materials at least to render it neutral before applying hypochlorites as germicides. It is advised also to neutralize the alkalinity which is always found in commercial hypochlorite before using it on contaminated water

The fact is noted that bleaching powder bought in retail stores is always much decomposed, and usually in such a way as to become more alkaline. If it has lost one-half its strength twice as much bleach will not do the same work, because its action is retarded by the extra alkali. If sanitary arrangements in a community are not of the best, such chloride of lime may be a real menace, as it does not have the intended effect, although still having the confidence of the user. In a case cited a paper carton that was found on sale in a store contained only traces of available chlorine.

Chloride of lime decomposes seriously on a large scale when stored for a long time or under unfavorable conditions, and may introduce similar though less pronounced irregularities into practical bleaching.

It is suggested that whenever possible sodium hypochlorite solution be used in place of bleaching powder: and, still better, that chlorine itself be stored as liquid

chlorine. There is no loss or uncertainty so long as it is kept in the cylinder, and when made up it can be used at once before serious decomposition takes place.

New Process of Scouring and Bleaching. British Patent 170,534, issued to R. W. R. Mackenzie, E. H. Robinson and Morris Fort.

Relates to the purification of vegetable fibers by means of ordinary methods of scouring and bleaching, assisted by extraction of the goods with organic solvents. A safer and easier removal of more substantial amounts of various impurities of natural and foreign origin than by the processes hitherto proposed is effected, including not only oil, fat and wax, but resinous matter, oxidized or partially oxidized oils, coloring matters and nondescript organic and mineral matter. It is particularly valuable when applied to fabrics containing particles of unremoved woody matter, seed, tick or shell, old oil stains, unsaponifiable oils and waxes derived from size which render fabrics difficult to bleach by ordinary scouring and bleaching methods.

The patentees have found that organic solvents boiling at higher temperatures than water are better extraction agents than volatile solvents of lower boiling point. Linen and cotton yarns and fabrics in the damp or wet state can be extracted with organic solvents without drying previous to extraction if solvents of a sufficiently high boiling point are applied at a high temperature equal to or above the boiling point of water. Also solvents at a higher boiling point than water compared with similar volatile solvents—that is, organic solvents of similar chemical series or of related type, but of lower boiling point than water—are more efficient extraction agents when applied hot or boiling for the extraction of mixed impurities of natural or extraneous origin, in the form of a crude wax from linen and cotton yarns and fabrics. Moreover, if this extraction of mixed impurities is intended to aid subsequent scouring, bleaching and finishing of the yarns and fabrics, greater assistance is given by the use of higher boiling organic solvents.

The value of the process for removing impurities of foreign origin is also considerable. Old oil stains, from spinning or weaving, or associated with the presence of seed or shell, especially where, as frequently happens, the yarns of fabrics have been gassed or singed, or where yarns have been chemicked without the oil being properly removed first, or even heated or boiled without the oil being completely removed, may present themselves by reason of oxidation or other changes, as stains difficult or impossible of removal by ordinary volatile solvent extraction. The brown stains which are frequently left after removal of oil, fat and wax are extremely difficult to bleach out afterwards. Hot solvent treatment in bulk is far quicker and more effective than ordinary scouring and bleaching or hand treatment, and gives superior results in the removal of difficult stains of this type; likewise, partly oxidized oils, resinous matter and unsaponifiable waxes occurring, for example, as foreign impurities in sized yarns and fabrics are more quickly and perfectly removed.

The apparatus may be the technical equivalent of a Sohxlet extractor readily adapted for employing hot or boiling solvent alone or in conjunction with hot solvent vapor.

Artificial Silks. Joseph Foltzer, translated from the French by T. Woodhouse. 5 x 8¼, illustrated, 240 pp. London, Sir Isaac Pitman & Sons, Ltd.

The second edition of this work has been translated and new material has been added to fill the present volume, which covers the latest developments of the manufacture of artificial silk industry. The contents are: I. Introductory; II. Cellulose; III. Origin of Artificial Silk; IV. Chardonnet Artificial Silk; V. Despeissis Artificial Silk; VI. Solutions and Apparatus for Mixing; VII. Spinning Mill; VIII. The Cleaning of Spinnerets; IX. Filtration of Water; X. Drying, Humidification, and Ventilation; XI. Winding, Twisting, Reeling and Counting; XII. Waste; XIII. Viscose; XIV. Luster Artificial Silk; XV. Recovery of By-products; XVI. Solution of Cellulose; XVII. Precipitating Liquids; XVIII. Spinning of Artificial Silk; XIX. Other Imitations of Natural Silk; XX. Organization of Staff; XXI. General Notes; XXII. Distinctive Characteristics; XXIII. Dyeing; XXIV. Conversion of Cellulose; Index.

Principles of Worsted Spinning. Howard Priestman. London: Longmans, Green & Co. 15s. net.

This is the second edition of what has been a highly appreciated work, explaining the principles of worsted spinning. It deals in order with materials and qualities, spindle theories, drafting and ratch, drawing, cone drawing, spinning, automatic doffers, dry-spun yarns, twisting, winding, reeling and warping, defects and remedies. In large part the book remains very much like the first edition, but a new chapter has been added on automatic doffers, in which the author reviews the conditions to be satisfied in perfecting the mechanical doffing of spinning frames. He describes the leading principles and mode of action of the several types of automatic doffers which are now in use, and also deals in limited measure with the "Leeson" type of winding frame.

British Patent 166,297, issued to F. W. Atack and J. Anderson, February 11, 1920.

Patentees describe a process for the manufacture of vat dyes in which B-Aminoanthraquinone and caustic potash are heated with a non-hydroxylic solvent or diluent, such as aniline, naphtralene, etc., at or near the boiling point. Impure anthraquinone-1:2:2':1'-NN'-dihydroazine, which dyes cotton green from a hydrosulphite vat, is obtained when aniline is used and the mixture is boiled under a reflux condenser, but when naphthalene is used in presence of an oxidizing agent, such as potassium nitrate, and the mixture is boiled under a reflux condenser, pure Indanthrene Blue is obtained.

Recent Patents

Green Acid Dyestuffs Containing Chromium, and Process of Making Same

(1,394,823; October 25, 1921)

ARMIN GROB (assignor to Society of Chemical Industry in Basle, Basle, Switzerland)

Process described consists in treating with chromating agents the ortho-oxy-azo dyestuffs derived from mononitro-ortho-oxy-diazo compounds and 2-aminonaphthalene compounds which are not substituted in their 1-position and are capable of combining with a diazo group in an acid medium at their 1-position chroming agents which are Cr_2O_3 compounds.

Green Dyestuff, and Process of Making Same

(1,396,483; November 8, 1921)

VICTOR VILLIGER and HEINRICH VON KRANNICHFELDT

Process consists in producing a green product by heating alpha-naphthaquinone in the presence of water until it is substantially decomposed, and treating the yellow product first formed with a non-alkaline reducing agent.

Artificial Silk

(1,398,525; November 29, 1921)

ROBERT DENIS LANCE (assignor of one-half to Cecil Shrager, London, England)

Claim is made for an artificial silk comprising a cellulose ester having a metallic resinate with a high fusion point, said resinate not exceeding 20 per cent.

Clothometer Gage

(1,398,565; November 29, 1921)

JOHANNES TH. PEDERSEN (assignor by mesne assignment to the Measuregraph Company, Missouri)

Claims a housing for a measuring machine, having a guide slot through which the cloth is pulled when measuring same, in combination with a ledge adjacent to the slot, and projecting from the rear side of the housing, and means carried on the ledge—and removed from the side of the housing—for marking the edge of the fabric.

Machine for Mercerizing Hose and Other Knitted Fabrics

(1,400,159; December 13, 1921)

ALFRED ERNEST HAWLEY, PERCY FIELD CROSLAND and FRANCIS GRAHAM DIXON

Means are described for mercerizing and washing hose and similar knitted or woven goods, said means comprising stretching forms or plates on which the goods are mounted, and a series of pairs of rollers between which pairs of rollers the forms are passed, each succeeding pair of rollers being driven at a greater peripheral speed than the preceding pair, whereby the goods on the forms are firmly held or stretched while being subjected to the action of the mercerizing agent.

Process for Degumming Textile Fibers

(1,397,875; November 22, 1921)

JACOB MEISTER

This describes a process for degumming textile fibers through the action of enzymotic substances which comprises preliminarily treating the fibrous material in a diluted alkaline bath containing borax and ammonia, and then treating said material in a second bath at a moderate temperature with an ammoniacal enzymotic solution which contains borax and sodium chloride, the material finally rinsed.

Apparatus for Chlorine Control

(1,400,393; December 13, 1921)

JAMES W. VAN METER

Claims an apparatus for chlorine control comprising a chamber adapted to contain a liquid, a transparent vessel below the chamber and adapted to be fed with liquid therefrom, a receiving vessel within the transparent vessel; means for supplying chlorine to said inner vessel, which has a bleeder port through which chlorine exudes in drops into the liquid.

Dyestuff, and Mode of Producing It

(1,399,014; December 6, 1921)

EADY HART (assignor of one-half to Isabella Jessie Stewart, Ballarat, West Australia)

Claims an improved dyestuff consisting of the product obtained by immersing a chromogenic vegetable substance divided into small parts in a solution containing sodium carbonate and lime, boiling the mixture and filtering the resultant liquor.

Artificial Textile Fabric, and the Process for Its Manufacture

(1,394,270; October 18, 1921)

JACQUES EDWIN BRANDENBERGER

Describes a process comprising the steps of emulsifying a viscous solution and a gaseous fluid which is inert to said solution, and expressing the resultant emulsion through a drawing plate to produce an article containing an internal series of bubbles of said fluid.

Process for the Treatment of Vegetable Fibers

(1,400,380; December 13, 1921)

CHARLES SCHWARTZ (assignor to Societe Gillet et Fils, Lyon, Rhone, France)

This is a process for the treatment of vegetable fibers, for the purpose described, consisting in impregnating the fiber with a solution of an amylaceous substance, drying the fiber, passing the same into concentrated nitric acid.

and precipitating the nitrated amylaceous substance upon the fiber by washing.

Process for the Treatment of Vegetable Fibers

(1,400,381; December 13, 1921)

CHARLES SCHWARTZ (assignor to Societe Gillet et Fils, Lyon, Rhone, France)

Claim is allowed for the treatment of vegetable fibers, with a view to imparting to them the character of wool, both physically, as to feel, appearance and caloric quality, and chemically, as regards their affinity and absorbent capacity, said process consisting in fixing upon the fiber products resulting from the hydrolysis of proteic substances by the action of strong mineral acids thereon.

Production of M-Nitro-P-Cresol

(1,394,150; October 18, 1921)

CLARENCE G. DERICK, WALTER M. RALPH and LAWRENCE H. FLETT (assignors to National Aniline & Chemical Company, New York)

This describes the method of diazotizing p-toluidin which comprises dissolving about 107 parts of p-toluidin in about 265 to 290 parts of sulphuric acid (66 deg. Be.), diluted with about 400 parts of water, whereby the heat of dilution of the sulphuric acid is utilized in dissolving the p-toluidin, adding about 1,100 parts of water thereto, cooling the resulting solution and adding sodium nitrite.

Dyeing Machine

(1,397,860; November 22, 1921)

HOWARD M. DUDLEY

Describes, in a dyeing machine, in combination, a closed receptacle, a dyeing chamber within the receptacle and spaced therefrom, the dyeing chamber having a foraminous top and a foraminous bottom, a propeller chamber connecting the upper and lower chambers formed by the tops and bottoms of the receptacle and the dyeing chamber, a revoluble propeller within the propeller chamber, a series of openings connecting the side chambers formed by th sides of the dyeing chamber and the receptacle with the lower portion of the propeller chamber and a series of openings connecting the side chambers formed by the side of the dyeing chamber and the receptacle with the upper portion of the propeller chamber.

Process for Producing Wool-Like Effects on Cotton Fabrics

(1,400,016; December 13, 1921)

GUSTAV ADOLPH BOSSHARD (assignor to the Firm A.-G. Seeriet, Bleicherei, Filiale Arbon, Arbon, Switzerland)

Claim is made, in a process for producing wool-like effects on cotton fabrics, for the step wherein the fabrics are treated with nitro-sulphuric acid of 48.3 deg. Be., cooled down to at least 0 deg. Cent.

Fireproofing of Textile Fabrics and Other Porous Articles

(1,397,858; November 22, 1921)

THOMAS JOHN IRELAND CRAIG (assignor of one-half to Whipp Bros. & Tod, Ltd., Manchester, England)

Claim is allowed for the process of rendering fibrous or absorbent materials and the like less inflammable, which consists in first treating said materials with an aluminate of an alkali metal, then subsequently treating said materials with a solution containing sodium bicarbonate, and finally subjecting said materials to heat.

Process of Making Colored Nitrocellulose Compounds

(1,399,357; December 6, 1921)

LESTER J. MALONE (assignor to Eastman Kodak Company, Rochester, N. Y.)

Claims the process of making a colored nitrocellulose composition, which comprises the steps of dyeing the nitrocellulose fibers and then dissolving said dyed fibers in a nitrocellulose solvent.

Dyeing Machine

(1,400,417; December 13, 1921)

FREDERICK CARTER

This describes a dyeing machine comprising a receptacle, a T-shaped member supported above and extending into the receptacle and guides positioned at each end of the T-shaped member, whereby the material to be dyed may be guided through said receptacle.

Method of Manufacturing Fiber Products

(1,399,976; December 13, 1921)

GEORGE JAMES MANSON (Continuation of application serial No. 32,418, filed June 5, 1915)

Describes a process of manufacturing a fiber product which comprises, first, chipping sawmill waste, then grinding the raw chipped wood with water between closely spaced surfaces having a movement relative to each other, such surfaces being sufficiently far apart to permit at the narrowest point the presence of a plurality of fiber bundles therebetween, whereby a rolling separation is effected.

Process for the Treatment of Vegetable Fibers

(1,399,804; November 29, 1921)

CHARLES SCHWARTZ (assignor to Societe Gillet et Fils, Lyon, Rhone, France)

This is a process for the treatment of vegetable fibers with a view to impart to them the character of wool, both physically, as to the feel, appearance and caloric quality, and chemically, as regards their affinity and absorbent capacity for dyestuffs, said process consisting in impregnating the fiber with a solution of cellulose in concentrated nitric acid, and precipitating upon the fiber a slightly nitrated cellulose by washing with water.

Dyeing Fibers, Threads or Fabrics

(1,398,357; November 29, 1921)

JOHN FREDERICK BRIGGS and CHARLES WILFRED PALMER (assignors to American Cellulose & Chemical Manufacturing Company, Ltd., Delaware)

Describes a method of facilitating the dyeing of fibers, threads or fabrics of or containing cellulose acetate, which comprises subjecting the same to the action of a thiocyanate in solution.

Process of Dyeing, and Apparatus Therefor

(1,399,230; December 6, 1921)

BENJAMIN F. TOUCHSTONE, THOMAS E. GARDNER, JAMES A. BANGLE, DAVID M. SULLIVAN and JOHN ERNEST HARDIN

This is a method of treating warp which consists in reducing a complete set of yarn ends or threads to sheet form, conducting the sheet continuously through common yarn dyeing and treating means, and then in continuous pursuance to said treatment, winding the same directly upon a loom beam.

Process of Precipitating Viscose

(1,399,587; December 6, 1921)

FRANZ STEIMMIG

Describes a process for treating cellulose products for the manufacture of films and filaments, which consists in squirting the viscose into an acid-free concentrated solution of a neutral salt also containing only a small percentage of an ammonium salt.

Machine for Unraveling Knitted Goods and Winding the Yarn

(1,399,657; December 6, 1921)

MICHAEL F. ROBISCHON

Patent relates, in a machine for unraveling knitted goods having a plurality of feeds, to the combination of a thread-drawing unit for each feed of the knitted goods, each drawing unit comprising a movable thread-engaging member having at different parts thereof different drawing speeds, a thread guide movably mounted to direct the thread to differently speeded parts of the thread-engaging member, a movable arm engaged by the thread as it comes from the knitted goods and adapted to be moved by its thread in one direction when said thread becomes tight and to be moved by the thread in the other direction when the thread becomes loose, and means operatively connecting said thread guide and said arm whereby the guide is moved to the lower speeded part of the thread-engaging member when the thread is tight and to the higher speeded part when the thread is loose, and means for moving the thread-engaging members of the various drawing units at a given relative speed, a rack for holding the fabric to be unraveled and means for obtaining relative movement between said fabric rack and the rest of the machine whereby the unraveling points on the fabric remain in operative position relative to their respective drawing units.

Heating Wall for Coke Ovens and the Like

(1,399,275; December 6, 1921)

ARTHUR ROBERTS (assignor to American Coke & Chemical Company, Chicago, Ill.)

Description is given of a coke oven heating wall comprising courses of blocks, the courses breaking joints with each other, each block having its four corners recessed to provide, in conjunction with the adjoining blocks a series of passages extending in zigzag fashion between the blocks of the successive courses, and each block having in its lower central portion a downwardly projecting tongue entering into the space between the recesses of the two blocks immediately below it, whereby gases traveling lengthwise of the wall are compelled to pass around said tongues, and are therefore compelled to travel in zigzag fashion, substantially as described.

Take-Up Mechanism for Knitting Machines

(1,399,121; December 6, 1921)

KENNETH HOWIE (assignor to Wildman Manufacturing Company, Norristown, Pa.)

Patentee describes, in combination in a take-up for knitting machines, a pair of take-up rolls, a movable support therefor, driving means for the take-up rolls, including a clutch, a connection from the movable take-up support for controlling the clutch and adjustable gravitating means for exerting pressure to vary the driving action of the clutch according to the demands of the work, said adjustable gravitating means including a weight, a pivotally mounted beam carrying the weight and exerting pressure upon the movable take-up support and through it upon the driving clutch, said beam extending in a plane substantially parallel with the take-up rolls.

Yarn Severing and Clamping Device for Knitting Machines

(1,400,180; December 13, 1921)

ALBERT M. PIGEON (assignor to Wildman Manufacturing Company, Norristown, Pa.)

Patentee describes a yarn severing mechanism for knitting machines, including in combination a needle cylinder, needles carried thereby, yarn guides, a relatively fixed shearing blade, a movable shearing blade, a spring for actuating said last-named blade for its shearing action, an oscillatory cam, and devices cooperating with said cam to shift and set said movable shearing blade against the tension of the spring, to hold said blade in its set position, and to trip said blade, all during movement of said oscillatory cam one way.